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SPECIAL AMERICAN ASSOCIATION ISSUE CONTAINING THE REPORTS OF THE FIFTH WASHINGTON MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. EDITED BY BURTON E. LIVINGSTON, PERMANENT SECRETARY

# SCIENCE

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VOL. LXI, No. 1571

FRIDAY, FEBRUARY 6, 1925

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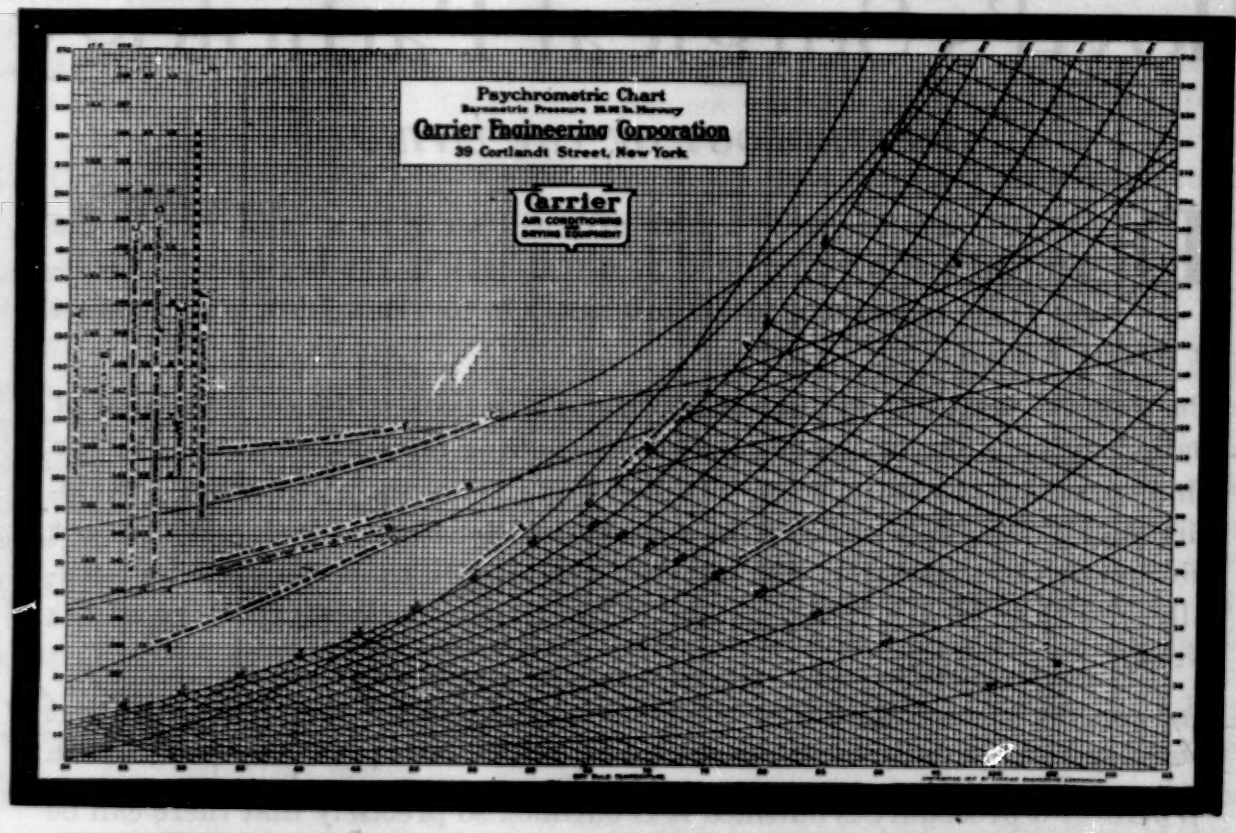


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# SCIENCE

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## THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

### THE PERMANENT SECRETARY'S REPORT ON THE FIFTH WASHINGTON MEETING

#### GENERAL FEATURES

The fifth Washington meeting of the American Association for the Advancement of Science closed on Saturday, January 3rd. This was the seventy-ninth meeting of the association and the annual meeting for the association year 1924–25. Meeting with the association at Washington were 35 associated societies, of which number 24 are officially affiliated, and also 11 other societies that met with the association by invitation. All the fifteen sections of the association itself were well represented in the programs.

The meeting was by far the largest in the history of the association and it excelled in many other ways. It is probably safe to assert that it was the largest gathering of all kinds of scientists in the history of the whole world. The total registration was 4,206. The largest registration record for earlier meetings was 2,413 (the last quadrennial meeting, at Chicago, 1920–21), and the registration for the meeting just ended was consequently 74 per cent. larger than the previous maximum record. The registration record for the fifth Washington meeting is probably not nearly complete, nor is it presumably as complete as are the records for the preceding meetings mentioned above. It is safe to estimate that the actual attendance was over 4,700. The Washington registration is shown in column 3 of Table 2.

A full week was fortunately available for this meeting. The first session of the executive committee of the association council and the secretaries' conference were held on Sunday, December 28th, a large number of societies held regular sessions on the following Monday and numerous sessions occurred every day throughout the week, the meeting not really closing till Saturday afternoon. Altogether, there were 252 sessions for the reading of papers and addresses. These sessions were distributed in the week as shown in second line of Table 1, which also presents a variety of comparative data on the fourth Washington meeting (December, 1911) and on the last five annual meetings. The first column gives the registration figures, the second the total membership at the close of each meeting, the third the total number of sessions in each meeting and the fourth the total number of

TABLE 1

| Meeting | Registration | Membership on Dec. 31 | No. of Sessions | No. of Papers | Sessions each day |
|---|---|---|---|---|---|
| Fourth Washington (Dec., 1911) | 1,306 | 8,041 | 163 | 979 | |
| Fifth Washington (Dec., 1924) | 4,206 | 13,695 | 252 | 1,781 | Mon. Tu. Wed. Th. Fri. Sat.<br>49 71 69 42 16 5 |
| Third Cincinnati (Dec., 1923) | 2,211 | 12,015 | 190 | 1,140 | Wed. Th. Fri. Sat. Sun. Mon. Tu. Wed.<br>2 29 62 56 4 22 11 4 |
| Fourth Boston (Dec., 1922) | 2,339 | 11,537 | 159 | 1,019 | Tu. Wed. Th. Fri. Sat.<br>2 45 54 52 6 |
| Second Toronto (Dec., 1921) | 1,832 | 11,414 | 123 | —— | Tu. Wed. Th. Fri. Sat.<br>13 34 44 30 2 |
| Third Chicago (Dec., 1920) | 2,413 | | 184 | —— | Mon. Tu. Wed. Th. Fri. Sat.<br>9 53 59 53 8 2 |

papers read in each case. The distribution of sessions throughout the period of each of the last five meetings, shown at the right of the tabulation, is set forth here largely as a matter of record. They have been brought together by Dr. Francis D. Murnaghan, assistant secretary.

Perhaps the number of scientific papers presented at the Washington convention may be a better index of its magnitude and importance than is the number of persons in attendance. There were approximately 1,781 papers and addresses given. The residential distribution of the authors of these is of considerable interest and it is shown in Table 2, along with some other interesting numerical data, which have been supplied by Dr. Murnaghan. It is interesting to note that the registration in the District of Columbia was markedly larger than the membership and that the number of papers presented from the district was 36 per cent. of the membership and 33 per cent. of the registration. Other suggestive or significant points may be noted, but they can not be considered here.

Most of the sessions were held either in the George Washington University or in the Central High School Building, though a goodly number were held elsewhere. The biological groups were all cared for in the Central High School Building.

The hotel accommodations at Washington are excellent and were easily adequate for this enormous gathering. The hotel headquarters of the American Association were in the New Willard Hotel, which placed a number of complimentary rooms at the disposal of the association. The registration and publicity offices, respectively in charge of Mr. Sam Woodley, executive assistant, and Mr. Austin H. Clark, chairman of the subcommittee on publicity, were in that hotel. To the management of the New Willard Hotel the association is very grateful indeed. The various societies had their headquarters at different hotels, mostly not far from the New Willard.

The lanterns used at the sessions were supplied gratis, mainly by the Bausch and Lomb Optical Company, who thus loaned twenty-five of their balopticons. The Trans-lux Daylight Picture Screen Company loaned 18 of their excellent daylight screens. The Spencer Lens Company and the Scientific Cinema and Supply Company also loaned projection apparatus and screens. The Bausch and Lomb Optical Company also furnished gratis twenty-five microscopes for demonstrations. To these firms the association is deeply and appreciatively grateful. This was the first association meeting at which daylight screens were generally used in the session rooms and they proved wonderfully satisfactory.

The arrangements for the fifth Washington meeting were made by the local committee and the local representatives for the sections, to each member of which the association and the societies owe a debt of gratitude. The preliminary preparations, which are always difficult enough, were doubly so this year, because of the lack in Washington of any group of buildings suitable for housing such a meeting. Those

in attendance spoke very highly of the efficiency with which the difficult task had been accomplished. The membership of the local committees and the local section representatives are shown below.

*The Local Committee for the Meeting*

William Mather Lewis, *chairman*, president of the George Washington University.

C. G. Abbot, assistant secretary of the Smithsonian Institution.

Gilbert H. Grosvenor, president of the National Geographic Society.

Vernon Kellogg, permanent secretary of the National Research Council.

John C. Merriam, president of the Carnegie Institution of Washington.

TABLE 2

| State | Total Membership | Registration | | Papers presented | | |
|---|---|---|---|---|---|---|
| | | Actual | Percentage of Membership | Actual | Percentage of Membership | Percentage of Registration |
| Alabama | 58 | 10 | 17 | 2 | 3.5 | 20.0 |
| Alaska | 4 | 0 | 0 | 0 | 0.0 | — |
| Arizona | 78 | 10 | 13 | 4 | 5.1 | 40.0 |
| Arkansas | 41 | 12 | 29 | 5 | 6.2 | 41.7 |
| California | 1,036 | 54 | 5 | 56 | 5.4 | 103.7 |
| Colorado | 136 | 11 | 8 | 8 | 5.9 | 72.7 |
| Connecticut | 283 | 115 | 40 | 50 | 21.2 | 43.5 |
| Delaware | 44 | 24 | 54 | 1 | 2.3 | 4.2 |
| District of Columbia | 666 | 740 | 111 | 242 | 36.3 | 32.7 |
| Florida | 65 | 16 | 25 | 3 | 4.6 | 18.8 |
| Georgia | 96 | 23 | 23 | 5 | 5.2 | 21.7 |
| Idaho | 32 | 2 | 1 | 1 | 3.1 | 50.0 |
| Illinois | 919 | 178 | 19 | 95 | 10.3 | 53.4 |
| Indiana | 212 | 54 | 25 | 19 | 9.0 | 35.2 |
| Iowa | 263 | 47 | 18 | 23 | 8.8 | 48.9 |
| Kansas | 146 | 41 | 28 | 45 | 30.8 | 109.8 |
| Kentucky | 110 | 25 | 23 | 6 | 5.5 | 24.0 |
| Louisiana | 111 | 20 | 18 | 8 | 7.2 | 40.0 |
| Maine | 71 | 29 | 41 | 15 | 21.1 | 51.7 |
| Maryland | 343 | 238 | 69 | 79 | 23.0 | 33.2 |
| Massachusetts | 896 | 276 | 31 | 135 | 15.1 | 48.9 |
| Michigan | 379 | 136 | 36 | 63 | 16.6 | 46.3 |
| Minnesota | 260 | 64 | 25 | 48 | 18.5 | 71.2 |
| Mississippi | 30 | 8 | 27 | 4 | 13.3 | 50.0 |
| Missouri | 288 | 52 | 18 | 37 | 12.9 | 71.2 |
| Montana | 45 | 3 | 7 | 7 | 16.0 | 233.3 |
| Nebraska | 126 | 17 | 13 | 18 | 14.3 | 105.9 |
| Nevada | 25 | 1 | 4 | 0 | 0.0 | 0.0 |
| New Hampshire | 66 | 29 | 44 | 17 | 25.8 | 58.6 |
| New Jersey | 419 | 135 | 32 | 48 | 11.5 | 35.6 |
| New Mexico | 24 | 0 | 0 | 0 | 0.0 | — |
| New York | 2,365 | 684 | 29 | 243 | 10.2 | 35.5 |
| North Carolina | 120 | 58 | 48 | 15 | 12.5 | 25.9 |
| North Dakota | 35 | 6 | 17 | 6 | 17.1 | 100.0 |
| Ohio | 700 | 194 | 28 | 82 | 11.7 | 42.3 |
| Oklahoma | 89 | 11 | 12 | 5 | 5.6 | 45.5 |
| Oregon | 96 | 5 | 5 | 4 | 4.2 | 80.0 |
| Pennsylvania | 976 | 371 | 38 | 92 | 9.4 | 24.8 |
| Rhode Island | 83 | 32 | 39 | 8 | 9.6 | 25.0 |
| South Carolina | 53 | 17 | 32 | 2 | 3.8 | 11.8 |
| South Dakota | 40 | 5 | 12 | 1 | 2.5 | 20.0 |
| Tennessee | 67 | 33 | 49 | 8 | 11.9 | 24.2 |
| Texas | 227 | 18 | 8 | 23 | 10.1 | 127.8 |
| Utah | 66 | 6 | 9 | 3 | 4.5 | 50.0 |
| Vermont | 49 | 13 | 27 | 4 | 8.1 | 30.8 |
| Virginia | 169 | 121 | 71 | 32 | 18.9 | 26.4 |
| Washington | 138 | 7 | 5 | 5 | 3.6 | 71.4 |
| West Virginia | 81 | 48 | 59 | 10 | 12.4 | 20.8 |
| Wisconsin | 277 | 78 | 28 | 63 | 22.7 | 80.8 |
| Wyoming | 23 | 4 | 17 | 3 | 13.0 | 75.0 |
| Canada | 327 | 84 | 25 | 41 | 12.5 | 48.8 |
| Porto Rico | 24 | 2 | 8 | 4 | 16.7 | 200.0 |
| Other countries | 292 | 33 | 11 | 12 | 4.1 | 36.4 |
| Total | 13,509 | 4,200 | 31 | — | — | |

David White, home secretary of the National Academy of Sciences, and senior geologist, Geological Survey, U. S. Department of the Interior.

*The Committee on Special Arrangements*

Walter M. Gilbert, *chairman*, Carnegie Institution of Washington.

Albert L. Barrows, National Research Council.

Paul Brockett, National Academy of Sciences.

Austin H. Clark, U. S. National Museum.

Hugh Miller, George Washington University.

W. J. Showalter, National Geographic Society.

Henry F. Haasé, *committee secretary*, Carnegie Institution of Washington.

*The Subcommittees*

*Finances:* Walter M. Gilbert, *chairman;* John L. Wirt, E. A. Varela (all of the Carnegie Institution of Washington).

*Meeting Places:* Hugh Miller, *chairman;* Arthur F. Johnson (George Washington University); W. E. Tisdale (National Research Council).

*Hotels:* Albert L. Barrows, *chairman;* Effie A. Reed, W. L. Schmidt (all of the National Research Council).

*Transportation:* Paul Brockett, *chairman* (National Academy of Sciences).

*Exhibition:* W. J. Showalter, *chairman;* W. D. Bondwell, Arthur H. Bumstead, George Diffenderfer, Jr. (all of the National Geographic Society).

*Publicity:* Austin H. Clark, *chairman;* W. N. Mann, W. P. True (all of the Smithsonian Institution).

*The Local Representatives for Sections*

*Section A (Mathematics)*, Howard L. Hodgkins (George Washington University); *Section B. (Physics)*, Lyman J. Briggs (U. S. Bureau of Standards); *Section C (Chemistry)*, R. S. McBride (Chemical Engineer, Colorado Building); *Section D (Astronomy)*, W. S. Eichelberger (U. S. Naval Observatory); *Section E (Geology and Geography)*, W. C. Mendenhall (U. S. Geological Survey); *Section F (Zoological Sciences)*, Paul Bartsch (U. S. National Museum); *Section G (Botanical Sciences)*, R. F. Griggs (George Washington University); *Section H (Anthropology)*, J. Walter Fewkes (Smithsonian Institution); *Section I (Psychology)*, William C. Ruediger (George Washington University); *Section K (Social and Economic Sciences)*, Frederick L. Hoffman (Babson Institute, Wellesley Hills, Mass.); *Section L (Historical and Philological Sciences)*, Frederick E. Brasch (Smithsonian Division, Library of Congress); *Section M (Engineering)*, William Bowie (U. S. Coast and Geodetic Survey); *Section N (Medical Sciences)*, M. X. Sullivan and Carl Voegtlin (Hygienic Laboratory); *Section O (Agriculture)*, Karl F. Kellerman (Bureau of Plant Industry); *Section Q (Education)*, C. R. Mann (American Council of Education).

The preliminary announcement of the Washington meeting was somewhat larger than ever before, containing 90 pages. It was sent to all members of the association December 1. The General Program, a book of 247 pages, including a summary of events by days, was printed, as has to be done, within the last ten days before the opening of the meeting. It was ably edited by Dr. Sam F. Trelease, secretary of the council, who was assisted by Mrs. Trelease. This very difficult job of printing was efficiently carried out by the Williams and Wilkins Co., of Baltimore. To the society and section secretaries the permanent secretary wishes to express his thanks, for their fine spirit of cooperation in furnishing the program manuscripts in time to be printed. Programs of all the organizations taking part in the Washington convention were included in the General Program; none had to be omitted because received too late.

Two program supplements were printed and made available on Tuesday and Wednesday mornings, respectively. Supplement No. 1 consisted mainly of a very useful catalog of the exhibitions, which was very kindly prepared by Dr. Earl S. Johnston, of the University of Maryland.

Probably the most disappointing feature of this meeting was the fact that not nearly enough programs had been printed, as became evident Monday. The supply was exhausted early Tuesday forenoon and those who registered on Tuesday or later in the week could not be supplied. To care, in a measure, for this unforeseen difficulty, the summary of events was reprinted Tuesday night and given out as Supplement No. 2.

## THE SECOND ANNUAL PRIZE OF ONE THOUSAND DOLLARS

The same member who made it possible for the American Association to award the prize at Cincinnati has given the sum of five thousand dollars to be devoted to five annual thousand-dollar prizes, one to be awarded at each of the five annual meetings beginning with the meeting just closed. The donor wishes his name withheld. According to the terms of the gift and the rules adopted by the association council, the prize is to be awarded to some person presenting at the annual meeting a notable contribution to the advancement of science. All papers presented on the programs of the Washington meeting were eligible for consideration, whether or not their authors were members of the association. The secretary of each section and society that met at Washington was asked to consult others and submit titles of papers presented in the sessions of his organization, for consideration in the making of the award. These nominations are being thoroughly investigated by the special Committee on Prize Award and the name of the winner will be announced in due time.

## THE WASHINGTON FUND

To care for the extra expenses of the fifth Washington meeting, a Washington Fund was established.

This was partly made up by collecting a fee of fifty cents from each person who had a railway certificate to be endorsed and validated, about $1,200 being collected in that way. Also, requests were sent early in the fall to all association members resident in or near Washington, asking that they make contributions to the Washington Fund. Two renewals of this request were sent out later. About 700 local members were thus asked to make contributions and about 450 responded to one or another of the requests. Altogether about $2,700 was given by the local members. In addition, nearly $300 was contributed by Washington societies and friends of the association. The total amount received for the Washington Fund was $4,140.90, which sufficed to cover perhaps two thirds of the extra expense connected with the meeting. The balance was covered by disbursements from the current funds in the permanent secretary's hands, derived from membership dues and the entrance fees of new members.

The fifth Washington meeting was naturally the most expensive meeting the association has ever held, and the portion of its cost paid from the current funds was larger than ever before. The association is to be congratulated on the fine and helpful spirit evidenced by so many of the local members in this connection and the permanent secretary wishes here to express the cordial and appreciative thanks of the organization to all who made donations to the Washington Fund, including friends of the association and the Washington societies that made appropriations for the fund. Those who attended the meeting from away are also to be heartily thanked for the fine spirit with which the payment of the fifty-cent validation fee was received. Only two or three out of several thousand who had railway certificates validated expressed any disapproval of the validation fee.

### THE EXHIBITION AT WASHINGTON

The Washington exhibition of research apparatus, scientific books and laboratory supplies was the most extensive ever held by the American Association, and the most successful. The preliminary work of arranging for exhibits was very ably carried out by Dr. Charles A. Shull, of the University of Chicago, manager of the exhibition, who began by sending out several hundred letters of invitation to as many firms, asking them to enter exhibits. Dr. Shull carried on for weeks prior to the meeting a voluminous correspondence in this connection. As soon as general arrangements for each exhibit had been completed, data thereon were sent to the local subcommittee on exhibits, who took full charge of the local arrangements. This subcommittee consisted of W. J. Showalter (*chairman*), W. D. Bondwell, Albert H. Bumstead and George M. Diffenderfer, Jr., all of the National Geographic Society. The actual work of installing the numerous exhibits had almost entirely to be accomplished in two or three days, for the exhibition rooms did not become available till the Saturday preceding the meeting. The general exhibition opened on Tuesday afternoon and a supply of the catalog of the exhibitions was available at that time and throughout the rest of the week.

Exhibits by firms and some of the prominent society exhibits were housed in the gymnasium of the George Washington University, where there were also a few exhibits by individuals and some very striking ones from branches of the government service. The exhibits of individual scientists and some of the society exhibits were in other places, near the meeting places of the various societies. The biological groups were housed in the Central High School Building. This unavoidable scattering of exhibits was necessitated by the lack of any single group of buildings in Washington adequate for arranging the meetings all in one place. The subcommittee on exhibits is to be greatly complimented on securing an excellent and generally satisfactory arrangement under very difficult circumstances. The exhibiting firms contributed almost the whole of the expense connected with the general exhibition. A few of the exhibitors found the separation of the general exhibition hall from the meeting places of great disadvantage, but most of them were pleased, even in spite of the isolation of the general exhibition.

The following statements are excerpts from a report prepared by Mr. Showalter, chairman of the Subcommittee on Exhibits.

In spite of the bad weather, with the attendant snow, and further in spite of the two miles that separated the general exhibition from the meeting places of all the biological, and some of the other societies, we had excellent attendance. On Tuesday afternoon and evening there were about a thousand visitors. On Wednesday the attendance was even larger. On Thursday, New Year's Day, it was about 500, and on Friday as many more. Most of the visitors were local and visiting scientists. A single organization, the E. Leitz Company, set up a $30,000 exhibit. The Bausch and Lomb Optical Company's exhibit, and those of the Eastman Kodak Company, James G. Biddle, the Cambridge Instrument Company, the Spencer Lens Company, the Leeds and Northrup Company and the General Biological Supply House were also specially notable. It is estimated that the total value of the materials exhibited ran well beyond $100,000. How successful the exhibition was from the standpoint of the average exhibitor may be gathered from the fact that one man exhibiting a little scientific novelty booked more than 500 orders during his stay. With some 12,000 square feet of space asked for, there was less than 7,000 square feet to assign, and yet every exhibitor was pleased with his

allotment, his location and the plans for routing the visitors through the exhibition hall. One of the interesting sidelights on the exhibition was the interest the visitors took in the book exhibits. I found that these exhibits were a constant source of interest.

The catalog of the exhibitions was prepared by Dr. Earl S. Johnston, of the University of Maryland, who thus gave a very valuable service to the association and the assembled scientists. The catalog was published as a supplement to the general program, being printed Monday night. Dr. Sam F. Trelease and Mrs. Trelease edited the manuscript and cared for the proofreading, which had to be done in the small hours of Tuesday morning.

Besides the general exhibition and the society exhibitions, there were a number of important exhibitions in the laboratories and offices of the various branches of the government service, and the elaborate exhibition of recent researches by the Carnegie Institution of Washington, installed in the Administration Building of the institution, was a very important feature of this aspect of the Washington meeting.

A fuller account of the Washington Exhibitions, prepared by Dr. Charles A. Shull, appears on page 159 of this issue of SCIENCE.

## SOCIAL AND ENTERTAINMENT FEATURES AT WASHINGTON

*(Report by Francis D. Murnaghan)*

On Wednesday, December 31st, at 12:30 o'clock, President Coolidge received members and guests of the association at the East Entrance of the White House and gave a short address of welcome, in which he spoke highly of the scientific progress at present being achieved in the United States. President Coolidge's address appears in full on page 23 of the issue of SCIENCE for January 9. About fifteen hundred persons attended this reception and two panoramic photographs were taken of the group. One of these shows President Coolidge in front of the group and the other is a side view showing the President delivering his address from the steps of the White House. Copies of the photographs may be obtained from F. A. Schutz, Photographer, 1405 F St., N. W., Washington, D. C., the prices being $2.00 and $1.50, respectively.

On Monday evening, December 29th, the annual reception of the association, given by the local members, was held in the New National Museum immediately after the opening session. Over fifteen hundred members and guests attended this reception. The United States Marine Band furnished inspiring music, refreshments were served and the entire museum was open. In the same building and at the same time was held the annual biological smoker under the joint auspices of the association and the Union of American Biological Societies.

On Tuesday evening, December 30th, at 9 o'clock, a very enjoyable reception and dance was given by the Columbian Women of George Washington University to President and Mrs. Lewis of the university and to the visiting scientists and their guests. The reception was held at the Washington Club and was well attended.

A concert and dance was given by the Cornell Musical Clubs at the New Willard Hotel on the evening of January 1st at 8:30. All those in attendance at the meeting of the association were cordially invited to attend.

The National Geographic Society entertained about two hundred geographers, geologists and teachers of geography at the Hubbard Memorial Building, the headquarters of the society. A very enjoyable luncheon was provided on Monday, Tuesday, Wednesday and Thursday and the hospitality of the society was much appreciated.

On the afternoon of Monday, December 29th, the College Women's Club was at home to women attending the meeting. Dr. Emmeline Moore gave a most interesting talk on her experiences in South Africa as an exchange professor from Cornell University. Dr. Moore, whose specialty is fish culture, is a member of the State Conservation Committee, of Albany, N. Y.

To those in attendance at the meeting was extended the hospitality of the American Association of University Women through its national headquarters and club at 1634 I St., N. W. Many of the women visitors enjoyed the use of the public rooms of the club and enjoyed many courtesies from the national officers of the association. The club held a reception on the afternoon of New Year's day and this was well attended by the visiting women of science.

On Tuesday evening, December 30th, the Washington section of the Society of American Foresters entertained informally at the Cosmos Club at 8:30 o'clock.

## LUNCHEONS AND DINNERS

The various luncheons and dinners of the meeting were generally very well attended and were unusually successful. A list of these follows.

*Monday noon, December 29:*

Luncheon of the Phi Sigma Biological Research Society.

*Monday evening, December 29:*

Dinner of the Pi Mu Epsilon Mathematical Fraternity.

Dinner of the American Physical Society.

Dinner of the National Council of Geography Teachers.

Dinner session of the American Society of Zoologists.

*Tuesday evening, December 30:*

Dinner for geologists and geographers.

Dinner for all botanists.

Dinner of the American Psychological Association.

Dinner of the Metric Association.

Dinner of the Society of American Bacteriologists.

Dinner of the American Physiological Society.

Sigma Xi dinner.

*Wednesday morning, December 31:*

Luncheon of the American Astronomical Society.

Breakfast of the Sigma Delta Epsilon Graduate Women's Scientific Fraternity.

*Wednesday evening, December 31:*

Dinner for all zoologists.

Dinner for all physiologists.

Dinner for Section O (Agriculture).

Dinner of the Crop Protection Institute.

Dinner of Section Q (Education) and the Phi Delta Kappa Fraternity.

*Thursday noon, January 1:*

Luncheon of the Ecological Society of America.

*Thursday evening, January 1:*

Dinner for all mathematicians.

Dinner of the American Astronomical Society.

Dinner of the American Phytopathological Society.

Dinner of the American Society of Naturalists.

Dinner of the Association of Official Seed Analysts.

Dinner of the Gamma Alpha Graduate Scientific Fraternity.

*Friday noon, January 2:*

Luncheon for all philologists.

*Friday evening, January 2:*

Entomologists' dinner.

Anthropologists' dinner.

## ARRANGEMENTS FOR NEWSPAPER PUBLICITY AT THE WASHINGTON MEETING

A special effort was made this year to provide improved facilities by which the scientific material presented at the sessions might be made readily available to the representatives of the daily press. One of the prime aims of the association is to aid in the popularization and humanization of science, and the newspapers have become exceedingly helpful in this direction. The Washington meeting was given a large and a very widespread publicity of a very satisfactory character.

The press representatives are nowadays very glad to make good use of any scientific material that can be made understandable to the non-technical mind and there is a growing willingness on the part of our scientific workers to meet these representatives at least half way. In the long run, and especially from now on, the main burden of bringing science to the people at large rests on the shoulders of the scientists themselves. Some of the manuscripts sent in for this purpose were adversely criticized because they dwelt too exclusively on minor details of research results or because they presented merely topics that would be considered in the papers, without giving information as to what would be said on these topics. Scientific workers need to be reminded that the intelligent public, which is to be addressed in our efforts at publicity, are naturally lacking in background of scientific knowledge. Each presentation needs to begin with elementary considerations and such considerations are necessarily as far as it is possible to go in many instances.

The publicity arrangements at the meeting were in charge of the local subcommittee on publicity, which included Austin H. Clark as chairman, William M. Mann and Webster P. True. They served the association and the public very well indeed. As the manuscripts for the program came in at the Washington office, the permanent secretary sent a request to each person who was to give a paper, asking him to send an abstract and, if possible, a complete copy of his paper to the chairman of the subcommittee, and a duplicate of each to Science Service. About 1,200 abstracts, many accompanied by complete copies of the papers to be read, were received, the first coming in early in December. By the middle of the month so much material was coming in that from that time until the end of the meeting the chairman of the subcommittee had to devote all his time to the work of preparing it for presentation to the representatives of the press.

As soon as the abstracts began to arrive in large numbers contacts were established with the local newspapers and the press agencies, and their representatives were allowed to examine the material as it came in, so that they might form in advance definite ideas of what was to take place at the meeting. All the material was made available to Science Service and to the press representatives, and the responsibility of passing over such papers as contained matter that might possibly prejudice the public against science in any way was placed upon the shoulders of the latter. Those who have had the privilege of association with the Washington newspaper fraternity well understand that in covering a meeting of this character these men would keep constantly in mind the high mission of science and the prestige of the association, releasing for publication only material dignified in tone and devoid of purely sensational appeal.

It had been intended to prepare mimeographed press releases of many of the papers not accompanied by abstracts; but so much material came in that this was not practicable. It would have occupied the full time of several expert writers for several weeks. About seventy-five of the abstracts and a few of the complete addresses were mimeographed, and the remainder were classified according to the date upon which they were to be delivered and were then made available for examination by the representatives of the press. Most of this material had already been gone over and studied by them before the meetings began. This enabled them to spend the week of the meeting in securing interviews and in attending sessions which promised something of special interest.

Science Service cooperated cordially with the subcommittee on publicity, as in previous years. The material came in so well that Science Service was able to issue more complete and more timely reports than at any earlier meeting. In the *Daily Science News Bulletin*, sent to about 60 newspapers in all parts of the country and reaching some three million readers daily, there were 131 advance news stories about the meeting, of about 40,000 words in all. Many manuscripts received too late for use in that way are being used as the basis for later articles. Heretofore Science Service has never had more than two wire services for the association meeting, but this year five wire services were used. The daily wire stories were used more consistently and in better positions than ever before. The staff of Science Service covering the meeting numbered seven.

The publicity given to the Washington meeting by the newspapers, both of Washington and throughout the country, was very great and of a very high type. The association is very grateful to Mr. Clark and the other members of the publicity committee for their very great service in this connection. It is also very grateful to the staff of Science Service and the newspaper men for their very efficient and cordial help in this prime educational work.

ARRANGEMENTS FOR RADIO PUBLICITY AT WASHINGTON

A new departure was this year made in the publicity service of the association. Those who attended the last Chicago meeting, in December, 1920, will remember that an important feature of that meeting was an exhibit of apparatus showing the principles and operation of radio-telephony, the exhibit having been installed in the Chicago Art Institute for the period of the meeting, through the helpful cooperation of the National Research Council, the American Telephone and Telegraph Company, and the Western Electric Company. During the four years that have elapsed since the Chicago meeting, the science and art of radio broadcasting and receiving have grown by leaps and bounds, as every one knows, and the radio now furnishes a very feasible and satisfactory way for bringing information to a vast number of people not otherwise easily reached. It was very fitting that the systematic use of radio broadcasting should be first introduced as an integral part of the publicity work of the association at the Fifth Washington Meeting, the next quadrennial meeting to follow the Chicago meeting of 1920–21.

In June the Smithsonian Institution, which had been presenting a weekly program of scientific talks through the Radio Corporation of America, Station WRC, discussed with that station the practicability of giving a talk on each day the station was in operation during the Washington meeting. The Radio Corporation not only agreed to this but further suggested that, when practicable, these talks be broadcasted simultaneously from its Washington station and from its station in New York. Four talks in all were broadcasted by the Radio Corporation, three under the joint auspices of the American Association and the Smithsonian Institution and one under the special auspices of the Metric Association.

Through the fine cooperation of Dr. W. E. Tisdale, representing the National Research Council and Science Service, the Chesapeake and Potomac Telephone Company also agreed to broadcast from its Washington station a scientific talk on each of the evenings when that station was in operation, during the week of the meeting.

There were in all seven scientific talks sent out from the meeting by radio. These represented very well the broad field of science and, given by prominent scientists, they attracted much attention. Many gratifying responses of approval, by means of long-distance telephone and by mail, were received by the stations and speakers and these radio talks also aided distant newspaper publicity regarding the meeting.

The radio talks broadcasted from the Fifth Washington Meeting are listed below.

*Monday evening*, December 29, Station WCAP (Washington). Subject, "Scientific discoveries," by Dr. Ernest Merritt, Cornell University.

*Tuesday evening*, December 30, Stations WRC (Washington) and WJY (New York). Subject, "How trees grow," by Dr. D. T. MacDougal, Desert Laboratory of the Carnegie Institution of Washington.

*Tuesday evening*, December 30, Station WRC (Washington). Subject, "Metric weights and measures," by Dr. A. E. Kennelly, Massachusetts Institute of Technology and Harvard University.

*Wednesday evening*, December 31, Station WRC (Washington). Subject, "Why the earth is a magnet," by Professor W. F. G. Swann, Yale University.

*Thursday evening*, January 1, Station WCAP (Wash-

ington). Subject, "Is the universe finite," by Dr. Archibald Henderson, University of North Carolina.

*Friday evening*, January 2, Station WCAP (Washington). Subject, "The evolution of the stars," by Dr. Henry N. Russell, Princeton University.

*Saturday evening*, January 3, Stations WRC (Washington) and WJZ (New York). Subject, "Tree rings and climate," by Dr. A. E. Douglass, University of Arizona.

For the great and far-reaching success of the Washington radio program the association owes a debt of gratitude to Mr. Clark and Dr. Tisdale, to the Smithsonian Institution, the National Research Council, Science Service and the Metric Association, and to the National Radio Corporation and the Chesapeake and Potomic Telephone Company.

It is hoped that radio talks on scientific subjects may be arranged for future meetings of the association and that this feature of its work, introduced this year at Washington, may become increasingly important and influential.

### THE WASHINGTON GENERAL SESSIONS

There were eight general sessions of the association at Washington. The meeting was formally opened on the evening of Monday, December 29th, in Memorial Continental Hall. The president of the association, Dr. J. McKeen Cattell, presided at the opening session and introduced President W. M. Lewis, of George Washington University, and Charles Evans Hughes, Secretary of State. President Lewis, on behalf of the Washington scientific institutions, extended a cordial welcome to the association and Secretary Hughes spoke on "Some aspects of international cooperation." This address appeared in SCIENCE for January 9. President Cattell then introduced Dr. Charles D. Walcott, the retiring president of the association, who chose as the subject of his address "Science and service." Dr. Walcott's address has already appeared in full in the issue of SCIENCE for January 2, 1925. The opening session was very well attended, with about 1,850 members and guests of the association present.

The second general session of the meeting was held in the auditorium of the New National Museum on the afternoon of Tuesday, December 30th. At this session Mr. Austin H. Clark, of the Smithsonian Institution, spoke on the Navy's oceanographic program. Mr. Clark described the work done by the United States Navy in investigating tides and currents, erosion of shore lines and the relationships between the plants and animals of the sea, ever since the first American achievement in oceanographic research, a chart by Benjamin Franklin, published in 1770, which showed the course of the Gulf Stream. The recent development of H. C. Hayes's ingenious sounding device, by which the depth of water underneath a ship is found by means of a sound wave echoed from the ocean bottom, has greatly facilitated oceanographic research. A general conference on oceanography was held in the Navy Department on July 1st, 1924, and a comprehensive program of research was unanimously adopted. Results of much practical and scientific value are confidently expected. An audience of over 300 showed great interest in Mr. Clark's address, which was finely illustrated.

The third general session at Washington was held in Memorial Continental Hall on the evening of Tuesday, December 30th. This session was under the joint auspices of the Society of Sigma Xi and the American Association. The address of the evening was the third annual Sigma Xi lecture, given by Dr. F. F. Russell, general director of the International Health Board, whose subject was "War on diseases, with special reference to malaria and yellow fever." Dr. Russell described the successful work of the International Health Board Commission in practically driving yellow fever out of existence. He explained how the source of the infection was discovered and how the disease itself soon disappeared, once the source was removed. A description was given of the war now being waged, along similar lines, against malaria. The third general session was attended by over 350 persons.

The fourth general session of the meeting was held in the auditorium of the New National Museum on the afternoon of Wednesday, December 31st. Dr. Charles D. Walcott, retiring president of the association, gave a lecture on "Geological explorations in the Canadian Rockies," beautifully illustrated by ninety colored lantern slides. This session proved very popular and the large auditorium was filled to overflowing. Dr. Walcott told of the formation, millions of years ago, of the great Cordilleran Trough extending, with a breadth of from 100 to 200 miles, from the Arctic Ocean to Southern California. In this trough the animal life of both the Arctic and Pacific oceans mingled and as ages passed there was a deposit of sediment which in the deeper sections of the trough reached a thickness of over 18 miles. In later ages the sandstones, shales and limestone formations of the Cordilleran Trough were folded, broken and often pushed up into mountain ridges in which may be studied the records of the development of the plant and animal life from the tree ferns to the great sequoias and from the cold-blooded fishes and reptiles to the warm-blooded mammals and finally man.

The fifth general session of the meeting was held in the auditorium of the New National Museum on the evening of Wednesday, December 31st. Dr. Ed-

win E. Slosson, director of Science Service, described the meeting of the British Association for the Advancement of Science that took place in Toronto last August and gave a very enjoyable running comment on a series of motion pictures taken on the western trip that immediately followed that meeting. Despite the unfavorable weather an audience of about 550 heartily enjoyed this session. Dr. Slosson commented on the differences between the meetings of the British Association and those of the American Association, one of the most striking of which is the smaller number of scientific sessions and papers and the greater number of popular and instructive yet entertaining sessions at the meetings of the British organization. Another point brought out was the keen desire of the local community to have the British Association meet with them as evidenced by the generous provisions made by the government and city, as well as by private contributions, towards the expenses of the meeting.

At the sixth general session, held in the New National Museum on Thursday afternoon, Professor A. E. Douglass, director of the Observatory of the University of Arizona, gave an interesting and inspiring account of the "University of Arizona eclipse expedition of September, 1923." He showed a number of striking lantern slides made from photographs. The interest of the large audience was divided between the difficult arrangements that were made for precise scientific work in the desert and the astronomical results themselves.

The seventh general session was held in the New National Museum on the evening of Thursday, January 1st, with Dr. Willis T. Lee, of the U. S. Geological Survey, as the speaker. Dr. Lee showed a series of truly wonderful photographs and motion pictures from the Carlsbad Caverns of New Mexico. Dr. Gilbert H. Grosvenor, president of the National Geographic Society, under the auspices of which this first exploration of these great caverns was carried out, introduced the speaker. These are the largest and most interesting and instructive caves thus far known anywhere in the world.

The eighth general session was also held in the New National Museum, on the afternoon of Friday, January 2nd. The speaker was Dr. John Mills, of the Western Electric Company, who showed several reels of motion pictures specially prepared to illustrate the principles and operation of the telephone, human speech and audition. On account of the snow, this lecture was attended by only a small audience, but those who were present were amply repaid for their trouble and were very grateful to Dr. Mills for his clear and interesting explanations of these common but not generally understood phenomena.

## THE COMMITTEE ON THE STATE OF THE SCIENCES IN EDUCATION

The American Association has undertaken a thorough study of the rôle played and to be played by the sciences in education in general, this project having been authorized at the last annual meeting, at Cincinnati. A special committee on this very important work has been organized with Dr. Otis W. Caldwell, of Columbia University, as chairman and with about twenty members. Financial support for the work has been given to the association by the Commonwealth Fund, of New York City. The proposed plans have been discussed in a preliminary way in SCIENCE for December 12, 1924.

A meeting of the committee was held in Washington on January 1st, taking advantage of the great gathering of men of science. The committee chairman had presented the project in an address given at the Phi Delta Kappa Educational Fraternity's dinner on Wednesday evening, December 31st. Dr. Caldwell reports that the plans, as thus far worked out, include the following lines of activity: (1) The committee is to collect data on science instruction in all grades of educational institutions, numerous workers being asked to cooperate in this large task. (2) The committee is to secure as truthful and representative a summary as is possible of present thought on the nature and functions of the sciences in educational programs and on the philosophy of science in education. (3) The committee is to make suggestions and render assistance whenever possible in the carrying out of specific researches on the use of the sciences in general education. (4) The committee is to cooperate with others interested in having new types of subject-matter tried out in educational institutions, with careful studies of the results. (5) The committee is to aid and encourage the proper public presentation of real science knowledge and its interpretation. (6) The committee adopted a general plan for holding local conferences at education centers, and it invited all who are interested in this whole subject to write to the chairman, making constructive suggestions.

Real progress and tangible results should eventually come from the work of this special committee. It is inevitable that scientific knowledge should play a constantly increasing part in the life of civilized communities and in the social philosophy of individuals, and the time is ripe for a more serious study than has yet been made of the part the sciences should take in general education. The organization of this special committee of the American Association for the Advancement of Science may well mark a very great forward step toward bringing the true aims

of science and its methods of thought into the lives of the people.

### THE SECRETARIES' CONFERENCE

*(Report by Francis D. Murnaghan)*

The members of the executive committee of the association council and the secretaries of the various sections of the association assembled for a conference at the Cosmos Club on Sunday evening, December 28th. They dined together at 6:30 and many aspects of the affairs of the association were informally discussed during and after the dinner. In particular, the question of fellowship was considered in some detail and it is felt that the discussion provoked will be of great help to the section secretaries in passing upon fellowship nominations. These conferences, which have been held at recent annual meetings of the association, are proving to be very helpful and stimulating. With the continual growth of the association's activities close cooperation among the section secretaries and the members of the executive committee is becoming increasingly necessary. Gatherings of this kind help greatly in furthering this kind of cooperation.

## GENERAL OFFICERS FOR THE WASHINGTON MEETING

*President*

J. McKeen Cattell, Garrison-on-Hudson, N. Y.

*Retiring President*

Charles D. Walcott, Smithsonian Institution, Washington, D. C.

*Permanent Secretary*

Burton E. Livingston, Johns Hopkins University, Baltimore, Md. (Association mail address: Smithsonian Institution Building, Washington, D. C.)

*General Secretary*

D. T. MacDougal, Desert Laboratory, Tucson, Arizona.

*Treasurer*

R. S. Woodward, *deceased.*

*Assistant Secretary*

Francis D. Murnaghan, Johns Hopkins University, Baltimore, Md.

*Assistant Treasurer*

John L. Wirt, Carnegie Institution of Washington, Washington, D. C.

*Secretary of the Council*

Sam F. Trelease, University of Louisville, Louisville, Kentucky.

*Executive Assistant*

Sam Woodley, Smithsonian Institution Building, Washington, D. C.

*Auditor*

R. B. Sosman, Geophysical Laboratory, Washington, D. C.

*Members of the Executive Committee*

(Parenthesis indicates year at end of which member's term expires.)

Simon Flexner (1925), *Chairman;* Rockefeller Institute for Medical Research, New York, N. Y.

J. McKeen Cattell (1924), *President of the Association;* Garrison-on-Hudson, N. Y.

D. T. MacDougal (1924), *General Secretary of the Association;* Desert Laboratory, Tucson, Ariz.

Burton E. Livingston (1924), *Permanent Secretary of the Association;* Johns Hopkins University, Baltimore, Maryland.

H. L. Fairchild (1927); University of Rochester, Rochester, N. Y.

L. O. Howard (1924); Bureau of Entomology, U. S. Department of Agriculture, Washington, D. C.

W. J. Humphreys (1925); U. S. Weather Bureau, Washington, D. C.

G. A. Miller (1924); University of Illinois, Urbana, Ill.

W. A. Noyes (1927); University of Illinois, Urbana, Ill.

Herbert Osborn (1924); Ohio State University, Columbus, Ohio.

Henry B. Ward (1926); University of Illinois, Urbana, Ill.

## THE COUNCIL ROLL AT WASHINGTON

The affairs of the association are wholly in the charge of the council, which consists of the president, the vice-presidents, the treasurer, the secretaries, the council representatives of the affiliated societies and academies and eight members elected by the council itself. The list of council members for the seventy-ninth meeting is shown below, arranged alphabetically. Each member's name is followed by an italic phrase, showing his status in the council. Past presidents and the presidents of the divisions and local branch are officially invited to attend council sessions. Members of the executive committee who are not otherwise council members are *ex-officio* members. The attendance at the five Washington sessions is shown by the numerals that precede the members' names, the five numerals corresponding to the five sessions, respectively, on Monday, Tuesday, Wednesday, Thursday and Friday, December 29 to January 2. Thus, the numerals 2 and 3 before a name indicate that the member whose name is so marked was present at the Tuesday and Wednesday sessions but was absent from the other sessions.

Every council member receives an official notice calling his attention to his responsibility, just before each annual meeting, with the urgent request that he attend the council sessions and take part in the direc-

tion of the affairs of the association. It is to be deplored that not more of the members seem to realize the importance of their responsibilities to the cause for which the association stands, that not more of them make it a point to attend the council sessions.

The council holds sessions only at the annual meetings of the association and the attendance at these sessions should be as full as possible. The question may be asked whether those who absent themselves without arranging for substitutes are wholly fair to those who attend and to their constituents.

MEMBERS AND INVITED GUESTS OF THE COUNCIL FOR THE FIFTH WASHINGTON MEETING, WITH NOTES AS TO THEIR STATUS AND RECORDS OF THEIR ATTENDANCE

| | |
|---|---|
| 1, 2, 4 | Adams, C. C., *Rep. Ecol. Soc. Amer.* |
| 1, 2, 3 | Alexander, William, *Rep. Ohio Acad.* |
| 4, 5 | Anderson, E. N., *Rep. Nebraska Acad.* |
| | Baekeland, L. H., *Rep. Amer. Chem. Soc.* |
| | Baker, O. E., *Rep. Assoc. Amer. Geographers.* |
| | Baker, Thos. S., *Vice-President for Section K.* |
| 3 | Barr, A. S., *Secretary of Section Q.* |
| 1 | Bear, F. E., *Rep. Amer. Soc. Agron.* |
| | Berkey, C. P., *Rep. Geol. Soc. Amer.* |
| | Bingham, W. V., *Rep. Amer. Psychol. Assoc.* |
| 1 | Bixby, W. H., *Rep. Amer. Soc. Civil Engineers.* |
| | Boas, Franz, *Rep. Amer. Anthropol. Assoc.* |
| | Bowman, Isaiah, *Rep. Amer. Geographical Soc. of New York.* |
| 1, 2, 3, 4 | Brasch, F. E., *Secretary of Section L.* |
| 1, 3 | Breed, R. S., *Rep. Soc. Amer. Bacteriologists.* |
| 1, 2, 3 | Brown, P. E., *Secretary of Section O.* |
| | Buchner, E. F., *Rep. National Soc. College Teachers of Education.* |
| 1, 2, 3, 5 | Cairns, W. D., *Rep. Math. Assoc. Amer.* |
| | Call, L. E., *Rep. Amer. Soc. Agron.* |
| 1 | Calver, Homer N., *Rep. Amer. Publ. Health Assoc.* |
| 1, 2, 3, 4 | Calvert, P. P., *Rep. Entomol. Soc. Amer.* |
| | Campbell, W. W., *Past President* (1915). |
| | Case, E. C., *Rep. Michigan Acad.* |
| 1, 2, 3, 4, 5 | Cattell, J. McK., *Elected Member and President of the Association.* |
| | Chamberlin, T. C., *Past President* (1908). |
| 1 | Clark, W. M., *Rep. Soc. Amer. Bacteriologists.* |
| 1, 2, 5 | Clinton, G. P., *Rep. Amer. Phytopathol. Soc.* |
| | Close, C. P., *Rep. Amer. Soc. Horticultural Science.* |
| 1, 3 | Coker, R. E., *Rep. Amer. Soc. Zool.* |
| 1 | Colby, C. C., *Rep. Assoc. Amer. Geographers.* |
| 1 | Collins, G. N., *Rep. Amer. Genetic Assoc.* |
| | Compton, K. T., *Rep. Optical Soc. Amer. and Vice-President for Section B.* |
| 1, 4, 5 | Cottrell, F. G., *Elected Member and Vice-President for Section C.* |
| | Coulter, J. M., *Rep. Amer. Assoc. Univ. Professors and Past President* (1918). |
| 1, 2, 5 | Cowles, H. C., *Elected Member.* |
| 2, 3, 5 | Crittenden, E. C., *Rep. Illuminating Engineering Soc.* |
| 1, 2, 3 | Dellinger, O. P., *Rep. Kansas Acad.* |
| 3, 4 | Dodge, Homer L., *Rep. Oklahoma Acad.* |
| | Dublin, L. I., *Rep. Amer. Public Health Assoc.* |
| 2, 3 | Duggar, B. M., *Rep. Bot. Soc. Amer.* |
| | Eliot, C. W., *Past President* (1914). |
| 2 | Ellery, Edward, *Rep. Sigma Xi.* |
| | Fairchild, H. L., *Elected Member.* |
| | Fields, J. C., *Vice-President for Section A.* |
| | Fisher, Irving, *Rep. Eugenics Res. Assoc.* |
| | Flexner, Simon, *Exec. Comm. Member and Past President* (1919). |
| 1, 4 | Focke, T. M., *Rep. Math. Assoc. Amer.* |
| 1, 4 | Freeman, F. N. *Secretary of Section I.* |
| 1 | Gage, Simon H., *Rep. Amer. Assoc. Anatomists.* |
| | Gerould, John H., *Rep. Amer. Soc. Nat.* |
| | Gibson, Arthur, *Rep. Canadian Soc. Tech. Agriculturists.* |
| 2, 3, 4 | Goldfarb, A. J., *Secretary of Section N.* |
| 5 | Grave, Caswell, *Rep. Amer. Soc. Zool.* |
| | Grunsky, C. E., *President of Pacific Division.* |
| 1 | Hancock, Harris, *Rep. Amer. Assoc. Univ. Professors.* |
| | Harkins, W. D., *Secretary of Section C.* |
| | Harris, J. A., *Rep. Amer. Soc. Nat.* |
| 5 | Headlee, T. J., *Rep. Amer. Assoc. Economic Entomologists.* |
| | Hedrick, W. A., *Rep. Amer. Fed. Teachers of Math. and Nat. Sci.* |
| 1 | Hodgkins, H. L., *Rep. Amer. Math. Soc.* |
| 3, 4 | Hoffman, F. L., *Secretary of Section K.* |
| | Hollis, Ira N., *Rep. Amer. Soc. Mech. Engineers.* |
| | Hooton, E. A., *Vice-President for Section H.* |
| 1, 2, 3, 4, 5 | Howard, L. O., *Rep. Amer. Assoc. Economic Entomol. and Past President* (1920). |
| | Humphreys, A. C., *Rep. Amer. Soc. Mech. Engineers.* |
| 1, 2, 3, 4, 5 | Humphreys, W. J., *Rep. Amer. Meteorol. Soc.* |
| 1, 2, 3 | Jackson, H. H. T., *Rep. Amer. Soc. Mammalogists.* |
| 1 | Jensen, J. C., *Rep. Nebraska Acad.* |
| | Jones, A. J., *Rep. National Soc. College Teachers of Education.* |
| | Jones, E. Lester, *Rep. Amer. Soc. Civil Engineers.* |
| | Jones, L. R., *Vice-President for Section O.* |
| | Jordan, D. S., *Past President* (1909). |
| 1, 2 | Juday, Chancey, *Rep. Wisconsin Acad.* |
| | Judd, C. H., *Rep. National Soc. for Study of Education.* |
| 2, 3 | Karpinski, Louis C., *Vice-President for Section L.* |
| 2, 3, 4 | Kennelly, A. E., *Vice-President for Section M and Rep. Amer. Inst. Elec. Engineers.* |
| 1, 2, 3, 4, 5 | Knipp, C. T., *Rep. Illinois Acad.* |
| 1, 2, 3, 4, 5 | Kober, G. M., *Rep. Amer. Medical Assoc.* |
| | Landrum, R. D., *Rep. Amer. Ceramic Soc.* |
| | Laughlin, H. H., *Rep. Eugenics Res. Assoc.* |
| | Lidbury, F. A., *Rep. Amer. Electrochem. Soc.* |
| | Lindgren, Waldemar, *Rep. Amer. Inst. Mining and Metallurgical Engineers and Geol. Soc. Amer.* |
| 2, 4 | Linton, Edwin, *Vice-President for Section F.* |
| 1 | Littell, F. B., *Rep. Amer. Astronom. Soc.* |
| 1, 2, 3, 4 | Livingston, B. E., *Permanent Secretary of the Association.* |
| | Lyman, G. R., *Vice-President for Section G.* |
| | MacCallum, W. A., *Vice-President for Section N.* |
| 1, 2, 4 | MacDougal, D. T., *General Secretary of the Association.* |
| | McFarland, D. F., *President State College Branch.* |
| | McMurrich, J. Playfair, *Rep. Amer. Assoc. Anatomists and Past President* (1921). |
| | Mendenhall, C. E., *Rep. Amer. Phys. Soc.* |
| 1 | Mendenhall, W. C., *Vice-President for Section E.* |
| 1, 5 | Merriam, J. C., *Elected Member.* |
| 1, 2 | Metcalf, Z. P., *Rep. North Carolina Acad.* |
| | Michelson, A. A., *Past President* (1910). |

2 Miller, Dayton C., *Rep. Amer. Phys. Soc.*
Miller, G. A., *Elected Member.*
2, 5 Miller, Hugh, *Secretary of Section M.*
Miller, John A., *Vice-President for Section D.*
Miller, W. Lash, *Rep. Amer. Electrochem. Soc.*
1, 2, 3 Mitchell, S. A., *Rep. Amer. Astronom. Soc.*
1, 2, 3, 4 Moore, Barrington, *Rep. Soc. Amer. Foresters.*
Moore, E. H., *Past President* (1922).
1, 3, 5 Moore, E. S., *Secretary of Section E.*
3, 4, 5 Morehouse, D. W., *Rep. Iowa Acad.*
Morse, Edward S., *Past President* (1886).
Moseley, H. W., *Rep. New Orleans Acad.*
3 Moulton, F. R., *Secretary of Section D.*
Needham, J. G., *Rep. Entomol. Soc. Amer.*
Nelson, E. W., *Rep. Amer. Soc. Mammalogists.*
Nelson, N. C., *Rep. Amer. Anthropol. Assoc.*
1 Nice, L. B., *Rep. Oklahoma Acad.*
1 Nicholas, F. C., *Rep. Maryland Acad.*
Nichols, E. L., *Past President* (1907).
1, 2 Noyes, W. A., *Exec. Comm. Member.*
Oldfather, W. A., *Elected Member.*
1 Orton, W. A., *Rep. Amer. Phytopathol. Soc.*
1, 2, 3, 4, 5 Osborn, Herbert, *Exec. Comm. Member.*
1 Parsons, C. L., *Rep. Amer. Chem. Soc.*
Pearson, C. A., *Rep. Ecol. Soc. Amer.*
4 Pechstein, L. A., *Vice-President for Section Q.*
Peter, A. M., *Rep. Kentucky Acad.*
3, 4 Peterson, Alvah, *Rep. Gamma Alpha Frat.*
Piersol, G. M., *Rep. Amer. Medical Assoc.*
Prentiss, E. C., *President of Southwestern Division.*
Rand, H. W., *Secretary of Section F.*
Ransom, B. H., *Rep. Amer. Microscopical Soc.*
Reid, H. F., *Rep. Seismol. Soc. Amer.*
Remsen, Ira, *Past President* (1902).
Richards, T. W., *Past President* (1917).
1 Richardson, R. G. D., *Rep. Amer. Math. Soc.*
2, 3, 4 Richtmyer, F. K., *Rep. Sigma Xi and Optical Soc. Amer.*
1 Rietz, H. L., *Rep. Gamma Alpha.*
1, 2, 3, 4, 5 Roever, W. H., *Secretary of Section A.*
Sauveur, Albert, *Rep. Amer. Inst. of Mining and Metallurgical Engineers.*
Schramm, J. R., *Rep. Bot. Soc. Amer.*
1, 2, 3 Senior, H. D., *Rep. Amer. Assoc. Anatomists.*
3 Sharp, Clayton H., *Rep. Illuminating Engineering Soc.*
5 Shull, Chas. A., *Rep. Amer. Soc. Plant Physiologists.*
Stewart, G. W., *Elected Member.*
1, 2 Taylor, John B., *Rep. Amer. Inst. Elec. Engineers.*
3, 4, 5 Terry, R. J., *Secretary of Section H.*
Townley, S. D., *Rep. Seismol. Soc. Amer.*
3 Walcott, C. D., *Past President* (1923).
1, 2, 3 Walker, Elda R., *Rep. Nebraska Acad.*
5 Ward, Henry B., *Exec. Comm. Member.*
Warwick, C. L., *Rep. Amer. Soc. Testing Materials.*
Welch, P. S., *Rep. Amer. Microscopical Soc.*
Welch, W. H., *Past President* (1906).
Whipple, G. M., *Rep. National Soc. for Study of Education.*
Williams, S. R., *Secretary of Section B.*
Wilson, Edmund B., *Past President* (1913).
3, 4 Winslow, C.-E. A., *Rep. Amer. Public Health Assoc.*
Woodworth, R. S., *Vice-President for Section I.*
1 Wright, Sewall, *Rep. Amer. Genetic Assoc.*
3, 4 Wylie, R. B., *Secretary of Section G.*
1 Yerkes, R. M., *Rep. Amer. Psychol. Assoc.*

## LEGISLATIVE AND EXECUTIVE PROCEEDINGS AT WASHINGTON

The Executive Committee of the Council met at the Cosmos Club on Sunday afternoon, December 28, for the first session of the Fifth Washington Meeting. The second session occupied the forenoon of Monday, December 29, and a short session was held at the close of the council session on each of the four following days. All sessions excepting the first were held in the committee room (number 928) in the New Willard Hotel. The Council held its first session in the ball room of the New Willard Hotel on the afternoon of Monday, December 29, and it held sessions from 9 to 9:45 on the mornings of Tuesday, Wednesday, Thursday and Friday. No business was transacted at any of the general sessions of this meeting. The following paragraphs summarize the proceedings.

(1) Minutes of earlier meetings of the Council and Executive Committee were approved.

(2) The audited report of the treasurer's office for the fiscal year 1923–24 was accepted and ordered to be printed in SCIENCE.

(3) The audited financial report of the permanent secretary's office for the fiscal year 1923–24 was accepted and ordered printed in SCIENCE.

(4) The permanent secretary's budget for 1924–25 was approved.

(5) The following three members were elected to emeritus life membership under the provisions of the *Jane M. Smith Fund*: Ira Remsen, Johns Hopkins University; E. S. Dana, 24 Hillhouse Ave., New Haven, Conn.; H. C. Yarrow, 814 17th St., N. W., Washington, D. C.

(6) The following resolution was adopted concerning the interpretation of the by-laws on fellowship: Resolved, that the phrase "professionally engaged in scientific work" (By-laws, Article II, Section 4) is interpreted to include members who have contributed to the advancement of science, usually by the publication of scientific research or in other significant manner, such as teaching or directing research in an institution of repute.

(7) The Council appropriated the sum of three thousand dollars for grants for research in 1925, to be allotted by the Committee on Grants and disbursed from the available funds of the treasurer's office.

(8) The Council appropriated the sum of five hundred dollars as a temporary aid to the Union of American Biological Societies in its project for *Biological Abstracts*, to be disbursed from the available funds of the treasurer's office.

(9) It was voted that the committee on the award of the second American Association prize be constituted of residents of Washington, with Dr. E. W. Washburn as chairman, it having become clear that the award could

not be decided before the end of the meeting. The Award Committee consisted of the following members, as thus constituted: E. W. Washburn, *chairman*, C. G. Abbot, Frederick V. Coville, M. M. Metcalf, David White.

(10) The Council adopted the following resolutions concerning the future of arrangements with affiliated academies of science and local branches:

(a) In view of the rapid increase in the number of members concerned, it has become impossible to continue the annual grants to affiliated academies and local branches as in the past, and the association consequently finds it necessary to reduce the allowances for these organizations, for 1926 and until further notice, to one half of the present amount per member. This reduction is to go into effect October 1, 1925.

(b) All members of any affiliated academy are to be at all times, until further notice, eligible to admission to the association on certification by the proper academy officer and without payment of the usual entrance fee.

(c) The permanent secretary is instructed to take up the applications for academy affiliations according to the modified arrangements for academy affiliation now authorized.

(11) It was voted that all resolutions proposed for action by the Council shall be first considered by the Executive Committee.

(12) The Council approved the reorganization of the Committee of One Hundred on Scientific Research with Dr. J. McK. Cattell as chairman and with Dr. Rodney H. True as secretary. The chairman was instructed to proceed, with the advice of the Executive Committee, to fill vacancies on the committee and to name subcommittees as needed.

(13) A special committee, consisting of W. J. Humphreys, L. O. Howard and H. B. Ward, was named to consider and make recommendations concerning plans for extending the usefulness of the association by publication.

(14) It was voted that the president, with the advice of the Executive Committee, shall appoint three or more special committees of five or seven members each, to consider ways and means for improving the service of the association to the three following scientific fields and their respective societies: Engineering, Social and Economic Sciences, Historical and Philological Sciences.

(15) The secretary of the Committee on Philological Sciences in the association reported gratifying progress. The committee recommended to the Council the consideration of two projects in scientific philology, (a) the publication as soon as possible of a revised and enlarged edition of Du Cange's "Glossarium Mediae et Infimae Latinitatis," and (b) the establishment of a central laboratory for the scientific study of phonetics. The Council accepted the report and voted general approval of the projects. It was subsequently learned that the Du Cange project had already been cared for.

(16) The permanent secretary reported that Dr. A. Ross Hill had been named as chairman of the local committee for the next annual meeting, at Kansas City, and that Dr. H. J. Waters had been named as a vice-chairman. The Council expressed its hearty approval of these appointments.

(17) The Council voted that the annual meeting of December, 1927, shall be held in Nashville, Tennessee, and accepted with thanks the invitations that have been received from Nashville organizations and institutions.

(18) The Council voted to accept an invitation received from the Pacific Division, inviting the association to hold with the division a summer meeting at Portland, Oregon, next summer. It was voted that the association shall arrange for one address at the Portland meeting (preferably by the president of the association) and that the programs of the meeting are to be sent to all association members. It was also voted that the association would welcome a similar cooperation with the Southwestern Division.

(19) A portrait of Dr. Herman L. Fairchild, painted by Miss Luella Owen, of St. Joseph, Missouri, and presented by her to the association, was gratefully accepted and the permanent secretary was instructed to convey the thanks of the association to Miss Owen.

(20) The following officers were elected: president, general secretary, permanent secretary, treasurer, the secretaries of the sections, the chairmen of the sections, two Council members, three members of the Executive Committee, two members of the Finance Committee, and two members of the Committee on Grants for Research. The names of these newly elected officers are given on page 138 of this issue of SCIENCE.

(21) Six resolutions were adopted by the Council, on subjects that concern the general welfare, as follows:

(a) A resolution on breeding and feeding grounds of aquatic birds in the United States. (Adopted December 31.)

(b) A resolution on the Glacier Bay Region of Alaska. (Adopted December 31.)

(c) A resolution on a national arboretum. (Adopted January 1.)

(d) A resolution on oceanographic study. (Adopted January 2.)

(e) A resolution on illiteracy in the United States. (Adopted January 2.)

(f) A resolution on calendar reform. (Adopted January 2.)

(22) The Council voted general endorsement and hearty approval of the plans for the approaching International Congress of Plant Sciences, to occur at Ithaca, N. Y., August 16–23, 1926.

(23) Dr. E. S. Moore, secretary of Section E (Geology and Geography) reported that the Geological Society of America had adopted a resolution favoring that society meeting more frequently with the association, and the Council expressed its gratification.

(24) The Council gave a vote of thanks to Dr. E. S. Moore for the excellent geological program of the present meeting, arranged in the absence of the Geological Society of America.

(25) It was voted that a special item for the spring meeting of the Executive Committee shall be the appointment of a director of exhibits for the Kansas City meeting.

(26) An application for the consideration of the affiliation of the American Society of Parasitologists was constituted a special item of business for the spring meeting of the Executive Committee.

(27) The Council instructed the permanent secretary to convey the thanks of the association to the persons and organizations that had contributed to the success of the Fifth Washington Meeting.

(28) The Council gave a vote of hearty thanks to Dr. Cattell for the efficiency and tact with which he had presided at the Washington sessions of the Council.

(29) It was voted that the next meeting of the Executive Committee shall be on Sunday, April 26th, and that three sessions be arranged, with the usual dinner.

## RESOLUTIONS BEARING ON THE GENERAL WELFARE ADOPTED AT THE FIFTH WASHINGTON MEETING

### A RESOLUTION ON BREEDING AND FEEDING GROUNDS OF AQUATIC BIRDS IN THE UNITED STATES

Adopted by the Council of the American Association for the Advancement of Science, December 31, 1924

WHEREAS, The Migratory Bird Treaty Act of 1918 has already markedly increased bird life throughout the United States and Canada, notwithstanding the slender appropriations for its enforcement; and

WHEREAS, These benefits have recently been lessened by private and public drainage operations, often ill-advised and futile, and are seriously threatened by the activities of drainage companies soliciting business regardless of the value to agriculture of the lands they seek to drain; and

WHEREAS, Legislation is now pending for saving by purchase, without cost to the general taxpayers, many breeding and feeding grounds of aquatic birds for administration by the Department of Agriculture, and for raising a fund, without cost to the general taxpayers, for the better enforcement of the Migratory Bird Treaty Act; be it therefore

RESOLVED, That the American Association for the Advancement of Science regards this legislation as of the greatest conservational value because designed to save from destruction on a great scale not only water fowl and other migratory birds, but fur-bearing animals and fishes also, perhaps even to save many American species from extinction.

### A RESOLUTION ON THE GLACIER BAY REGION OF ALASKA

Adopted by the Council of the American Association for the Advancement of Science, December 31, 1924

WHEREAS, our system of National Parks contains no example of a tide-water glacier;

WHEREAS, the Glacier Bay Region in Alaska contains features of great and unusual scientific interest and value in addition to superb scenic features;

WHEREAS, it is important that a portion of the magnificent coastal forest of Alaska be preserved for all time in an absolutely natural condition;

WHEREAS, the Glacier Bay region will serve its highest usefulness to the people if permanently preserved in an absolutely natural condition; therefore be it

*Resolved*, That the Council of the American Association for the Advancement of Science hereby gives its hearty support to the establishment of a National Park or Monument at Glacier Bay, Alaska.

### A RESOLUTION ON A NATIONAL ARBORETUM

Adopted by the Council of the American Association for the Advancement of Science, January 1, 1925

WHEREAS, The present United States Botanical Garden is inadequate as to size, location, equipment and otherwise to meet the requirements of a national arboretum for the United States; and

WHEREAS, There is at present available in the District of Columbia a tract of land located between the Bladensburg Road and the Anacostia reclamation project, including Mt. Hamilton, Hickory Hill and that portion of the reclaimed Anacostia River flats that lie north of Benning Road; and

WHEREAS, The Mt. Hamilton tract has been pronounced by competent and impartial judges, including several members of Section G (Botany) of the American Association for the Advancement of Science, as admirably suited for the purposes of a national arboretum, and better suited for this purpose than any other site that has been proposed; and

WHEREAS, The Botanical Section of the American Association heartily approves of the arboretum project and has recommended this matter to the careful consideration of the Association Council; therefore be it

RESOLVED, That the Council of the American Association for the Advancement of Science, having given the national arboretum project careful consideration, expresses its full approval of that project as set forth above and recommends the establishment as soon as possible of a national arboretum commensurate in character and size with the importance of the work and the dignity and resources of the nation; and be it further

RESOLVED, That copies of this resolution be forwarded to the proper Congressional Committee and to the Commission of Fine Arts, and that this resolution be published in SCIENCE.

### A RESOLUTION ON OCEANOGRAPHIC STUDY

Adopted by the Council of the American Association for the Advancement of Science, January 2, 1925

WHEREAS, Many branches of science are dependent on data gathered from study of the sea, and many economic advantages are certain to accrue to the American people from oceanographic study; be it

RESOLVED, That the American Association for the Advancement of Science heartily endorses the program of the United States Navy for a detailed study of the sea, in cooperation with other interested governmental and private organizations and establishments engaged in oceanographic work, and strongly urges that necessary legislation to that end be enacted during the present session of Congress in order that this highly important work may begin in the year 1925; and be it further

RESOLVED, That copies of these resolutions be sent to the President of the United States, to all the members of the Cabinet, and to the Chairmen of the Committees on Naval Affairs of the Senate and of the House of Representatives.

### A RESOLUTION ON ILLITERACY IN THE UNITED STATES

Adopted by the Council of the American Association for the Advancement of Science, January 2, 1925

WHEREAS, Recent investigations by the Illiteracy Commission of the National Education Association and investigations by other organizations disclose an alarming amount of illiteracy in the United States;

WHEREAS, No adequate provision is made by the Federal Government that foreign-born persons should read and write English understandingly as a qualification for citizenship; and

WHEREAS, Such a condition is incompatible with the spirit of our democratic institutions; therefore be it

RESOLVED, That the American Association for the Advancement of Science approves the principle of an amendment to the United States Naturalization Law, which will require proof of ability to read and write English understandingly as a qualification for citizenship, and also that the Association recommends to the states that such proof be required as a qualification for voting.

### A RESOLUTION ON CALENDAR REFORM

Adopted by the Council of the American Association for the Advancement of Science, January 2, 1925

RESOLVED, That the American Association for the Advancement of Science approves of any alteration in the calendar that would adjust it to modern conditions for scientific work and that the association would welcome in this connection cooperation with other bodies such as the committees of the League of Nations that are concerned with this subject.

## FINANCIAL REPORTS

The annual report of the treasurer's office for the fiscal year 1924 (October 1, 1923, to September 30, 1924) is presented below. The total endowment of the association is shown to have been, on September 30 last, $133,245.95. Life membership fees, which are always added to the permanent endowment, amounted to $2,300 for the last fiscal year. For the next to the last fiscal year they amounted to $2,700. (For the first part of the current year, to January 13, 1925, they already amount to $3,100.)

Disbursements for individual grants for research, from appropriable funds in the treasury, amounted to $3,375 in 1924. (The sum of $3,000 has been appropriated for individual grants for 1925.)

The financial report of the permanent secretary's office for the fiscal year ending September 30, 1924, is also presented below. On last October 1 the generally available funds in the permanent secretary's hands amounted to $6,661.71, of which $3,500 was set aside for the publication of the next Proceedings volume. On October 1, 1923, the generally available funds amounted to $8,954.93, of which $2,500 was in the publication fund. The expenses of circulation for new members amounted to $5,317.77 in 1923–24, about 55,052 invitations having been sent to prospective members. (1,959 new members were received during the fiscal year.)

The total generally available receipts for the fiscal year recently closed were $61,055.31, of which $37,783.97 was paid to the publishers for the association's journals. The permanent secretary's office therefore had currently available about $22,000, which was disposed about as follows: $3,000 to divisions, local branch and affiliated academies, $5,000 for circularization, $2,000 for meetings, $2,000 for travel and section expenses, $1,000 to publication reserve, $9,000 for salaries, and the balance for miscellaneous expenses. These statements in round numbers may serve to illustrate approximately the way in which the current income from membership dues and entrance fees was distributed as current disbursements.

### *Report of the Treasurer's Office for the fiscal year 1924*

In compliance with Article III, Section 6, of the By-Laws, and by direction of the Council, the assistant treasurer has the honor to submit the following report, showing receipts and disbursements and disposition of funds and securities of the association for the year ending September 30, 1924. The total of cash receipts during the year is $13,857. Included in the amount is a contribution of $6,000 by a friend. Disbursements made in accordance with directions of the Council amount in the aggregate to $26,335. These include $20,000 invested in a mortgage for credit of the Endowment Fund of the association.

The total amount of the funds in the treasury, consisting of cash, cost value of securities, appraised value of securities received from the Colburn estate and mortgage is $145,339.24. The details of receipts, disbursements and disposition of funds are shown in the following itemized statements.

(Signed) JOHN L. WIRT,
*Assistant Treasurer.*

Dated: October 15, 1924.

BALANCE SHEET, SEPTEMBER 30, 1924

*Assets*

| | | |
|---|---|---|
| Investments: | | |
| Securities | $107,814.77 | |
| Mortgage, Washington, D. C., Real Estate | 20,000.00 | |
| Cash awaiting investment | 5,431.18 | $133,245.95 |
| Current Assets: | | |
| Cash in Bank | | 12,093.29 |
| | | $145,339.24 |

*Liabilities*

| | | | |
|---|---|---|---|
| Endowment Funds: | | | |
| General: | | | |
| W. Hudson Stephens | $ 4,381.21 | | |
| Richard T. Colburn | 84,155.74 | | |
| Friends of Association | 3,559.00 | 92,095.95 | |
| Sustaining membership fees | | 6,000.00 | |
| Life membership fees | | 30,150.00 | |
| Jane M. Smith | | 5,000.00 | 133,245.95 |
| Current Liabilities: | | | |
| Newcomb Cleveland, Research | 300.00 | | |
| Grants (Committee on Grants) Unallotted 1924 Appropriation | 825.00 | | |
| Unused balances, grants of previous years | 229.02 | | |
| Balance 1923 Appropriation | 825.00 | | |
| Jane M. Smith Fund | 300.00 | | |
| Prize Fund | 5,025.00 | | 7,504.02 |
| Unappropriated Fund | | | 4,589.27 |
| | | | $145,339.24 |

CASH STATEMENT

(October 1, 1923, to September 30, 1924)

*Receipts*

| | | | |
|---|---|---|---|
| 1923 | | | |
| Sept. 30 | Balance from last report, September 30, 1923 | | $30,002.47 |
| | Interest from securities | $ 4,601.75 | |
| | Interest from mortgage | 600.00 | |
| | Interest from bank balance | 126.23 | |
| | 23 Life Membership fees | 2,300.00 | |
| | Contribution to Prize Fund | 6,000.00 | |
| | Revertments, unused balances previous years | 229.02 | 13,857.00 |
| | | | $43,859.47 |

*Disbursements*

| | | |
|---|---|---|
| Newcomb Cleveland Research: | | |
| W. D. Harkins | | $ 200.00 |
| Grants (Committee on Grants): | | |
| R. H. Goddard | $ 190.00 | |
| C. W. Green | 225.00 | |
| W. Hamilton | 250.00 | |
| L. R. Ingersoll | 150.00 | |
| Donald A. Laird | 240.00 | |
| Franz Schrader | 200.00 | |
| Geo. H. Shull | 500.00 | |
| S. R. Williams | 250.00 | |
| Arthur Compton | 180.00 | |
| R. B. Thomson | 250.00 | |
| Sebastian Albrecht | 100.00 | |
| F. C. Blake | 190.00 | |
| James B. Mavor | 300.00 | |
| S. D. Townley | 150.00 | 3,175.00 |
| Brought forward | | 3,375.00 |
| Grant (Executive Committee): | | |
| Reinhard Dohrn, Director | | 500.00 |
| Subscriptions to SCIENCE, 380 Life Members at $3 | | 1,140.00 |
| 3 Life Members from Jane M. Smith Fund | | 300.00 |
| American Association Prize: | | |
| L. E. Dickson | | 1,000.00 |
| Rental of Safe Deposit Box | | 20.00 |
| Investment: | | |
| Mortgage | | 20,000.00 |
| | | 26,335.00 |
| Cash in Bank: | | |
| Endowment funds awaiting investment | $ 5,431.18 | |
| Drawing account | 12,093.29 | 17,524.47 |
| | | $43,859.47 |

AUDITOR'S REPORT

I certify that I have audited the accounts of the assistant treasurer of the American Association for the Advancement of Science for the period October 1, 1923, to September 30, 1924; that the securities representing the investments of the association have been exhibited and verified; and that the income therefrom has been duly accounted for. The financial statements accompanying the report of the assistant treasurer are in accord with the books of the association and correctly summarize the accounts thereof.

(Signed) ROBERT B. SOSMAN,
*Auditor*

Dated: December 2, 1924.

*Financial Report of the Permanent Secretary for the Fiscal Year 1924*

(October 1, 1923, to September 30, 1924)

*Dr.*

| | | | |
|---|---|---|---|
| To balance from last account: | | | |
| Checking account | | $ 180.95 | |
| Available reserves (Savings account): | | | |
| Emergency fund | $6,273.98 | | |
| Publication fund | 2,500.00 | 8,773.98 | $ 8,954.93 |
| To receipts from members: | | | |
| Annual dues previous to 1923 | | 65.00 | |
| Annual dues for 1923 | | 735.00 | |
| Annual dues for 1924 | | 58,509.76 | |
| Annual dues for 1925 | | 580.55 | |
| Entrance fees | | 1,115.00 | |
| Life-membership fees | | 2,300.00 | |
| Associate fees | | 50.00 | |
| For North Carolina Academy | | 62.00 | |
| For Ohio Academy | | 187.00 | 63,604.31 |
| To other receipts: | | | |
| Sales of publications | | 58.45 | |
| Postage, overpayments, etc | | 310.12 | |
| Interest on bank account | | 378.57 | |
| Miscellaneous receipts | | 92.48 | |
| Contribution from Commonwealth Fund, of New York | | 1,000.00 | 1,839.62 |
| | | | $74,398.86 |

| | | |
|---|---|---|
| *Cr.* | | |
| By publications: | | |
| Publishers of SCIENCE | | $37,783.97 |
| By division, local branch and academy allowances: | | |
| Division allowances | $ 1,581.00 | |
| State College (Pa.) local branch allowances | 30.50 | |
| Academy allowances | 1,467.00 | 3,078.50 |
| By expenses, General Secretary's Office | | 221.94 |
| By expenses, Washington Office: | | |
| Salaries | 8,854.63 | |
| Office and addressograph supplies | 241.00 | |
| Printing and stationery | 1,548.01 | |
| Telegraph and telephone | 142.53 | |
| Postage (correspondence and billing) | 859.90 | |
| Exchange | 8.62 | |
| Express, freight and drayage | 56.03 | |
| Notary fees | 1.50 | |
| Miscellaneous | 340.70 | 12,052.92 |
| By circularization expenses | | 5,317.77 |
| By miscellaneous expenditures: | | |
| Refunds of overpayments | 32.50 | |
| Life-membership fees (to Treasury) | 2,300.00 | |
| Contribution to American Institute of Sacred Literature | 60.00 | |
| Contribution to International Annual Tables of Physical, Chemical and Technological Data | 200.00 | |
| Annual meetings: | | |
| Third Cincinnati meeting: | | |
| General expenses $ 426.87 | | |
| Preliminary announcement 1,766.76 | | |
| Fifth Washington meeting 28.32 | 2,221.95 | |
| Expenses in connection with Toronto meeting of B. A. A. S. | 397.68 | |
| Travel expenses | 1,816.39 | |
| Section expenses | 543.51 | |
| Summarized Proceedings, 1925 | 26.00 | |
| Purchase of 1921 volume of Summarized Proceedings (11 copies) | 22.00 | |
| North Carolina Academy dues (collected for Academy) | 62.00 | |
| Ohio Academy dues (collected for Academy) | 186.00 | |
| Entrance fees paid to Academies | 140.00 | |
| Framing pictures of past presidents | 139.70 | |
| Exhibiting H. W. Butler painting of Solar Eclipse (Los Angeles meeting) | 78.00 | |
| Repairing graphotype | 51.32 | |
| Bad check | 5.00 | 8,282.05 |
| | | $66,737.15 |
| By new balance: | | |
| Checking account | 714.84 | |
| Available reserves (Savings account): | | |
| Emergency fund $2,446.87 | | |
| Publication fund 3,500.00 | 5,946.87 | |
| Commonwealth Fund contribution for study of place of science in education | 1,000.00 | 7,661.71 |
| | | $74,398.86 |

AUDITOR'S REPORT

Having been appointed auditor for the association for the year 1924, I have employed Mr. W. R. Gallaher, an accountant at the Interstate Commerce Commission, to go over the accounts of the Permanent Secretary for the year ending 1924. He makes the following report, dated December 4, 1924:

This is to certify that I have carefully examined the receipts and disbursements in currency, checks, etc., of the Permanent Secretary's office of the American Association for the Advancement of Science for the twelve months period ending September 30, 1924, and have found the records correctly kept. Proper vouchers were shown for all disbursements.

(Signed) W. R. GALLAHER,
*Examiner of Accounts*

I have reason to believe that Mr. Gallaher is an experienced and reliable accountant and that the above statement is a dependable report on the state of the accounts which were audited.

(Signed) ROBERT B. SOSMAN,
*Auditor*

Dated: December 11, 1924.

## OFFICERS ELECTED AT WASHINGTON

At the Fifth Washington meeting the following officers were elected:

PRESIDENT

M. I. Pupin, professor of electro-mechanics, Columbia University, New York, N. Y.

VICE-PRESIDENTS

Section A (Mathematics), W. A. Roever, professor of mathematics, Washington University, St. Louis, Mo.

Section B (Physics), H. M. Randall, professor of physics, University of Michigan, Ann Arbor, Mich.

Section C (Chemistry), H. B. Cady, professor of chemistry, University of Kansas, Lawrence, Kansas.

Section D (Astronomy), A. E. Douglass, professor of astronomy, University of Arizona, Tucson, Ariz.

Section E (Geology and Geography), R. A. Daly, professor of geology, Harvard University, Cambridge, Mass.

Section F (Zoological Sciences), H. S. Jennings, professor of zoology, Johns Hopkins University, Baltimore, Maryland.

Section G (Botanical Sciences), R. B. Wylie, professor of botany, State University of Iowa, Iowa City, Iowa.

Section H (Anthropology), Chas. B. Davenport, director of the Station for Experimental Evolution, Carnegie Institution of Washington, Cold Spring Harbor, N. Y.

Section I (Psychology), C. E. Seashore, professor of psychology, State University of Iowa, Iowa City, Iowa.

Section K (Social and Economic Sciences), F. R. Fairchild, professor of political economy, Yale University, New Haven, Conn.

Section L (Historical and Philological Sciences), W. A. Oldfather, professor of classics, University of Illinois, Urbana, Ill.

Section M (Engineering), F. G. Cottrell, director of the Fixed Nitrogen Laboratory, U. S. Department of Agriculture, Washington, D. C.

Section N (Medical Sciences), A. J. Carlson, professor of physiology, University of Chicago, Chicago, Ill.

Section O (Agriculture), C. V. Piper, agrostologist, U. S. Department of Agriculture, Washington, D. C.

Section Q (Education), Otis W. Caldwell, director of the Lincoln School, Teachers College, Columbia University, New York, N. Y.

### Permanent Secretary

Burton E. Livingston, director of the laboratory of plant physiology, Johns Hopkins University, Baltimore, Maryland. (Association mail address: Smithsonian Institution Building, Washington, D. C.)

### General Secretary

W. J. Humphreys, U. S. Weather Bureau, Washington, D. C., and George Washington University.

### Treasurer

J. L. Wirt, Carnegie Institution of Washington, Washington, D. C.

### Secretaries of the Sections

Section A (Mathematics), R. C. Archibald, associate professor of mathematics, Brown University, Providence, R. I.

Section B (Physics), A. L. Hughes, Washington University, St. Louis, Mo.

Section C (Chemistry), Gerald Dietrichson, University of Illinois, Urbana, Ill.

Section D (Astronomy), Philip Fox, professor of astronomy, Northwestern University, Evanston, Ill.

Section E (Geology and Geography), G. R. Mansfield, U. S. Geological Survey, Washington, D. C.

Section F (Zoological Sciences), G. T. Hargitt, professor of zoology, Syracuse University, Syracuse, N. Y.

Section G (Botanical Sciences), S. F. Trelease, professor of plant physiology, University of Louisville, Louisville, Ky.

Section H (Anthropology), R. J. Terry, professor of anatomy, Washington University School of Medicine, St. Louis, Mo.

Section I (Psychology), F. N. Freeman, professor of psychology, University of Chicago, Chicago, Ill.

Section K (Social and Economic Sciences), F. L. Hoffman, Babson Institute, Babson Park, Mass.

Section L (Historical and Philological Sciences), F. E. Brasch, Congressional Library, Smithsonian Division, Washington, D. C.

Section M (Engineering), N. H. Heck, U. S. Coast and Geodetic Survey, Department of Commerce, Washington, D. C.

Section N (Medical Sciences), A. J. Goldfarb, professor of biology, College of the City of New York, New York, N. Y.

Section O (Agriculture), P. E. Brown, Iowa State College, Ames, Iowa.

Section Q (Education), A. S. Barr, University of Wisconsin, Madison, Wis.

### Elected Members of the Council, for 4-year term

L. O. Howard, chief of the Bureau of Entomology, U. S. Department of Agriculture, Washington, D. C.

D. T. MacDougal, director of the Desert Laboratory, Carnegie Institution of Washington, Tucson, Ariz.

### Newly Elected Members of the Executive Committee

(Parenthesis indicates year at end of which member's term expires.)

B. M. Duggar (1925), Missouri Botanical Garden, St. Louis, Mo.

Vernon L. Kellogg (1928), permanent secretary of the National Research Council, Washington, D. C.

Edwin B. Wilson (1928), Harvard School of Public Health, Boston, Mass.

### Newly Elected Members of the Finance Committee

George K. Burgess, *chairman;* chief of the U. S. Bureau of Standards, Washington, D. C.

Arthur L. Day, director of the Geophysical Laboratory of the Carnegie Institution of Washington, Washington, D. C.

### Newly Elected Members of the Committee on Grants for Research

Joseph Erlanger, professor of physiology, Washington University School of Medicine, St. Louis, Mo.

Nevin M. Fenneman, professor of geology, University of Cincinnati, Cincinnati, Ohio.

### Newly Elected Members of the section committees, for 4-year term

Section A—E. W. Chittenden, University of Iowa, Iowa City, Iowa.

Section B—D. L. Webster, Leland Stanford University, California.

Section C—(No election reported.)

Section D—Frederick Slocum, Wesleyan University, Middletown, Conn.

Section E—A. P. Coleman, University of Toronto, Toronto, Ont.

Section F—S. O. Mast, Johns Hopkins University, Baltimore, Md.

Section G—R. H. True, University of Pennsylvania, Philadelphia, Pa.

Section H—T. W. Todd, Western Reserve University, Cleveland, Ohio.

Section I—Howard C. Warren, Princeton University, Princeton, N. J.

Section K—Maurice Holland, National Research Council, 29 W. 39th St., New York, N. Y.

Section L—H. E. Barnes, 186 Elm St., Northampton, Mass.

Section M—William Bowie, U. S. Coast and Geodetic Survey, Washington, D. C.

Section N—L. O. Howard, U. S. Department of Agriculture, Washington, D. C.

Section O—S. B. Haskell, Massachusetts Agricultural College, Amherst, Mass.

Section Q—Henry W. Holmes, Harvard University, Cambridge, Mass.

## THE PRESIDENT-ELECT

### *A Biographical Note*

Professor Michael I. Pupin, president-elect of the American Association for the Advancement of Science, has himself recently given to all of us a rarely perfect means of becoming well acquainted with his own history and with his very memorable contributions to the advancement of science and of civilization. Reference is here made to his well-known autobiography,[1] from which most of the material for the present note has been derived. Men and women of science and all friends of science and upholders of the principles and aims for which our association stands will do better than well to read that book from cover to cover. There is no more satisfactory presentation of the ideals of science, no better picture of the relation of individual scientific workers to the advance of knowledge and appreciation of nature. It is remarkably fortunate that the most recently elected member of the distinguished group of the presidents of the American Association should have just now expressed himself in so full and clear an account of the recent history of fundamental science in America and of his own chief articles of faith in the future of scientific research. This biographical note is consequently almost superfluous.

Born in 1858, in the agricultural hamlet of Idvor, not far from Belgrade, formerly in Hungary but now in the Yugoslav State, Professor Pupin received his early education in local schools and in Prague. Racially his parents were Serbs, as are all the peasant farmers of Idvor. As a boy he tended cattle during summer vacations on the grasslands about his native village and gathered lasting inspiration from the village wise men and from nightly vigils under the stars. The stars seem to have given him many a message in those youthful days. One of his boyhood pranks was to climb the high conical roof of the village mill, recently rethatched, to possess himself of the bright tin star fastened at its peak. The Idvor children thought that it was a real star fallen from heaven. The roof was very steep and smooth and the boy's mother regarded his escape from a serious fall as no less than miraculous; afterwards she interpreted the incident as a sign that he would climb very high in his life-work and that he would gather many real stars as he went. Her prophecy has surely been fulfilled.

In the early spring of 1874 Dr. Pupin came to New York as a steerage passenger without even money enough to supply himself with the much needed mattress and blanket. He had sold about all his belongings to procure his passage. The trip was stormy and he says he spent many nights on the deck of that immigrant ship hugging the warm smoke-stack. He landed at Castle Garden with only five cents in his pocket, wearing his only suit of clothes and with a red Turkish fez as his only hat. With no friend in this country, with all but no knowledge of the English language, with no money and practically no belongings, this young Serb began his American life. His first job was driving a mule-team on a Delaware farm. He had successively many jobs, moved about, sought experience and opportunity, learned the language and history of our country. He studied over the scientific exhibits at the Centennial Exposition in Philadelphia in 1876. He worked in a cracker factory in New York and read evenings in the Cooper Union Library, attending classes there and evening lectures. He gained much from Henry Ward Beecher's sermons in Plymouth Church, which he attended. He was greatly inspired by Booth's presentation of Shakespeare. A German workman cultivated in him a strong love for the Greek and Latin writers. Through attendance at Plymouth Church the young immigrant became acquainted with Dr. Charles Shepard, who made it possible for him to work his way through Adelphi Academy by means of an assistant's position in the Shepard hydropathic sanitarium.

In the fall of 1879 Professor Pupin became enrolled in Columbia University, having passed the entrance examinations with high honors. This was another accomplishment attained against difficulties that would have swamped most young men; another bright star had been achieved. The four years at college were very full. Young Pupin entered thoroughly into college athletics, in which he excelled as greatly as in his studies. He became intimate with youths of the best American culture and with some of their parents, partly through his great success in private tutoring, which was one of the main sources of his money during the college period. He gave little attention to science in these years. There was no laboratory science available and the Columbia science lectures carried little farther than he had already been able to go through hearing lectures at Cooper Union and through his reading. At the end of the college course he found difficulty in deciding whether he should adhere to his original plan and follow science or should turn to literary lines. The years in college rounded him out as a thoroughly representative American and gave him a broad background of American culture. He finally decided to follow Faraday and Maxwell. He wished to seek an answer to the question "What is light?"

Professor Pupin was graduated from Columbia

[1] Pupin, Michael. "From Immigrant to Inventor." Illustrated, 396 pp. New York and London; 1923, 1924.

College in 1883, having been admitted to full and complete citizenship in the United States on the day before the graduation exercises. He returned that summer for a visit to Idvor, his native village, and reported his progress to his mother, who encouraged him to go forward with his scientific work. That fall he entered Cambridge University, under the guidance of Mr. W. D. Niven, a fellow of Trinity College. After nearly a year of drill in mathematics calculated for Cambridge wranglers, Mr. Niven handed him Maxwell's little book on "Matter and Motion." It was apparently this book and the same author's "Theory of Heat" that gave the final bent to the future work of the future president of the American Association. By the end of that first year in Cambridge he had fallen under the spell of the writings of the great Clerk Maxwell. He says that he saw much light ahead and felt confident that the goal for which he was to steer was in sight. The summer of 1884 was spent partly at Pornic, a village in south Brittany ("just where the sea and the Loire unite," as Robert Browning has it), learning French, listening to the nightingales and reading Campbell's "Life of Maxwell"; partly in Paris, where he picked up in a second-hand shop a copy of La Grange's "Méchanique Analytique" and became entranced for life with the writing of the French Newton; and partly at his native village. Olympiada Pupin, the mother, was enthusiastic in her approval of her son's progress and well content that he should return to Cambridge, which she called "a great temple filled with the icons of the great saints of science the contemplation of whose saintly work would lead to communication with the spirit of eternal truth." That is what Cambridge University was and is and that is Pupin's idea of what a university should be.

The study of Maxwell's publications had left much to be cleared up and Pupin turned to a more thorough reading of Faraday's work, which had been the starting-point of much of the work of Maxwell. He sought and received fine advice from Tyndall. He worked with Rayleigh and with Stokes. The summer following his second year at Cambridge was spent at the old Macmillan cottage near Corrie, on the island of Arran in Scotland, reading and pondering over Faraday's "Electrical Researches" by day and turning himself loose evenings in the social activities of the summer colony there.

From Maxwell and Faraday the path of mental development traced in the autobiography leads next to Helmholtz, in Berlin. Professor Pupin went there in 1886, where he found his first extensive opportunities for experimental research. Here he became acquainted not only with Helmholtz and the group about him but also with Siemens and his wonderful organization of applied physics. The impression was made that Helmholtz and Siemens represent the highest type of the cooperation of pure and applied science.

Late in 1887 Pupin was present at a memorable meeting of the Berlin Physical Society at which Helmholtz made the first announcement of the great discovery of his pupil, Heinrich Hertz, which speedily became the main topic of discussion and experiment in all physical laboratories. The electromagnetic theory of Faraday had been extended by Maxwell and, starting from the combined work of these two, Hertz had succeeded, with Helmholtz's guidance, in constructing "a physical embodiment of the Faraday-Maxwell theory, represented by ideally simple apparatus operating in an ideally simple way. The apparatus and its operation are now the heart and soul of the radio art." That was the inauguration day of the electromagnetic theory of radiation. The science of light and the science of electricity had been brought together. It is in this field that Pupin is now especially a great leader.

Professor Pupin received the degree of doctor of philosophy at the University of Berlin in 1889, his dissertation being a mathematical research in physical chemistry, and the three theses that he "defended in public" on that occasion were as follows:

(1) Elementary instruction in physics should be as practical as possible.

(2) The thermodynamic methods of Gibbs, Helmholtz and Planck are the best foundation for studying physical processes that can not be satisfactorily analyzed by the methods of ordinary dynamics.

(3) The electromagnetic theory of light deserves more attention than has thus far been given it in university lectures.

Returning to America in 1889, Dr. Pupin became instructor in the newly established department of electrical engineering in the School of Mines of Columbia University. In a little brick building, dubbed "the cowshed" by the students, he and Professor Francis B. Crocker began their work, the beginning of electrical engineering as a university department in America. Apparatus was poor and scant. By a course of public lectures they secured money to buy some needed instruments. They succeeded with their students and Pupin found time for some fundamental research. He became adjunct professor of mechanics in 1891. It was in those days that he discovered the corona accompanying electrical discharge from a metal sphere in rarefied atmosphere, a discovery that has subsequently led to great advances in solar astronomy.

But the greatest thing that came from Pupin working evenings in his "cowshed" laboratory was the series of deductions that led to his invention of elec-

trical tuning. Applying to Rowland's distorted alternating currents the general principles employed by Helmholtz in his resonator analysis of sounds, an electric resonator was devised, which is now in use on all radio receiving sets. The word "tuning" was suggested by the operation of the Serbian bagpiper as he tunes his pipes. These results were published in 1894. "Tuning" is now generally used in the radio art and the analysis of complex harmonic electric motions accompanying articulate speech is now performed by Pupin's method of 1894.

Professor Pupin took up the subject of X-rays immediately after the announcement of their discovery by Roentgen late in 1895. He secured the first X-ray photographs made in America on January 2, 1896. His laboratory was immediately famous and visitors of many kinds became unbearably numerous. Physicians brought their patients to have X-ray photographs taken. Pupin used the fluorescent screen and could examine objects directly by means of the new radiation. Then he employed the screen between the object and the photographic plate and enormously shortened the requisite exposure. It was in February, 1896, that the first American surgical operation under the guidance of an X-ray picture was performed, and the picture was made by Pupin with his improved method, which is now universally used. A description of it was published in *Electricity* for April 15, 1896.

On that very day, in the midst of a lecture, Dr. Pupin was suddenly stricken with a violent chill, which was followed by a nearly fatal case of pneumonia. Recovery took many months and was finally due to the complete giving up of his usual lines of life and thought. He retired to the Berkshire hills in Connecticut and busied himself with the training of a team of fine horses. With these he won many prizes, including restored health.

In 1894 Pupin's attention had been recalled to La Grange's solution of the hypothetical problem concerning the vibration of weighted strings, and he had succeeded in finding a general solution of the famous problem. The thought shortly occurred to him that the principles involved should be applicable also to electric oscillations along a wire. It was this thought and the far-reaching invention that came of it that occupied Pupin when he returned to his scientific work after his full recovery. The mathematical theory of the Pupin coil for increasing the inductance of a telephone wire was communicated to the American Institute of Electrical Engineers in March, 1899, but the invention itself was not then discussed. Somewhat later a patent was secured and the Pupin high *inductance conductor* is now in general use. It has made international telephony over telephone cables possible, and such cables are called *pupinizierte Kabeln* in German, *les cables pupinizé* in French, while the Italians refer to their construction as *pupinizatione*.

The ideals and aims of the American Association for the Advancement of Science have been ably and continuously supported by Professor Pupin, who became a member of the association in 1895. He is characteristically idealistic and optimistic and a leader in the field of exact science. With a deep and original faith in the democratic principles of Benjamin Franklin and Abraham Lincoln, and with the constant conviction that the highest aim of science is to approach always nearer to everlasting truth, his helpful influence has been very pronounced in the organization of American scientific men. He was a charter member of the American Physical Society when it was organized in 1899 and has been very active in its rapid advance. A similar statement is true of the American Mathematical Society. In the progress of the technological societies in the field of physics and chemistry, the great engineering societies, Pupin has likewise taken an active part. He has ably supported the aims of the special technical societies and of the American Association as a whole, "to give a stronger and more general impulse and more systematic direction to scientific research and to procure for the labors of scientific men increased facilities and a wider usefulness."[2] Especially was Professor Pupin very active in the organization of the National Research Council, which has been successfully putting into practice during and since the war a scheme of wisely laid plans for furthering scientific research in many ways.

Professor Pupin is one of the few Americans who are equally eminent for theoretical research and for practical applications of science. If there be still some votaries of science who regard practical inventions as beneath or outside of the realm of their goddess, he is not one of them. He seems to have been led always by an invincible desire to advance fundamental and precise knowledge, but he has seen many valuable applications of his fundamental researches and has made them available to mankind. He is therefore a public benefactor in two spheres of activity, which in him are joined. He is one of our greatest mathematical physicists and also one of our greatest electrical inventors. He is now professor of electromechanics in Columbia University. He has received many scientific honors, prizes and medals. The doctorate of science was conferred on him by Columbia University in 1904, and that of laws was conferred by the Johns Hopkins University in 1917,

[2] Constitution of the American Association for the Advancement of Science, Article 1.

and by Princeton University and the University of New York in 1924. He has been awarded the Hébert prize of the Paris Academy, the Cresson medal of the Franklin Institute, the medal of the National Institute of Social Sciences, the Edison medal of the American Institute of Electrical Engineers, the Medal of Honor of the Radio Institute, and other similar recognitions. He is a recipient of the Pulitzer prize, for his autobiography. He is a member of the American Philosophical Society, of the American Academy of Arts and Sciences and of the National Academy of Sciences. The American Association for the Advancement of Science is indeed fortunate in having Michael I. Pupin as its president.—B. E. L.

## THE WASHINGTON SESSIONS OF THE SECTIONS AND SOCIETIES

Reports of the programs of the sections and societies at the Fifth Washington Meeting have been prepared from accounts sent in by section and society secretaries and others who have kindly acted as reporters. The permanent secretary is much gratified at the fine spirit of cooperation generally evidenced by the secretaries of the organizations that took part in the great Washington meeting. It must be realized that the task of preparing even a brief report on one session or a series is in itself something of an undertaking unless one is used to doing that sort of thing. The magnitude of this task is increased when the report must be prepared within a week or so following the close of such a meeting as we have just had. The permanent secretary wishes to express his thanks and also the appreciative gratitude of the association to all who have helped to make the reports of the Fifth Washington Meeting as good as they are.

The reports received naturally vary greatly in regard to suitability for use. Great improvement is shown from year to year, not only in the promptness with which the reports are sent in but also in the care and thought and ability with which they are prepared.

One of the greatest needs of present-day science is to perfect means by which the workers in any field may easily secure a fairly good idea of what is going on in other fields and the annual publication of these reports is planned to aid in that direction. Each branch of scientific endeavor that is represented by an organization in one of these great scientific conventions surely deserves appreciation by all scientific workers as well as by the intelligent public in general. The work of preparing these reports is consequently just as important to the sections and societies and to the advancement of learning as is that of preparing the programs. The secretaries and other reporters and the members of the various societies are asked to study this year's reports critically, and to note suggestions for further improvement in future years. It is true that the permanent secretary's part in this work is still much more in evidence than is desirable. The permanent secretary has done only his best in cases where the reports received seemed to require alteration or rewriting; doubtless this best is not very good in some instances and suggestions for future improvement will be gladly received.

The section reports are arranged below in the serial order of the association sections to which they pertain, together with the reports of those societies whose fields are of general or less technical interest. Lack of space precludes the publication in this issue of SCIENCE of all the reports of the societies that met with the American Association at Washington. The remaining reports, of which there are about forty, will appear in later issues, grouped according to the association sections to which the societies are most closely related.

Because of the very great attendance at the Fifth Washington Meeting the supply of the general program was exhausted and copies of it can not be supplied. The summary of events was reprinted, however, and copies of that may be had—as long as the supply lasts—on application to the Washington office.

### SECTION A (MATHEMATICS)

*Vice-president and chairman,* J. C. Fields.

*Retiring vice-president,* Harris Hancock.

*Secretary,* William H. Roever, Washington University, St. Louis, Mo.

(*Report by William H. Roever*)

Section A held two joint sessions, one on Wednesday morning with the American Mathematical Society and the Mathematical Association of America and the other on Thursday morning with Sections B and D and the two mathematical societies. In the absence of Professor J. C. Fields, Professor H. L. Rietz, president of the Mathematical Association of America, presided at the session on Wednesday morning and Professor Oswald Veblen, retiring president of the American Mathematical Society, gave an address entitled "Remarks on the foundations of geometry." A very brief outline of this address, which will be published in full in the *Bulletin of the American Mathematical Society,* will appear later in the report of the meeting of the society. The other address of this session was given by Professor Harris Hancock, retiring chairman of Section A, on the subject, "The foundations of the theory of algebraic numbers." In this address, which was published in full in SCIENCE for January 2 and 9, Professor Hancock made some general observations on the ultimate

recourse to mathematics in the formulation of physical theories and then introduced by simple examples the notion of number realms. He then pointed out that the extension of these realms by the introduction of new numbers necessitates the making of certain modifications, in order that the usual theorems of arithmetic may hold in the more general realms. The ideal factors of Krummer and Dedekind were mentioned and other points in the theory were illustrated. At the Thursday morning session Professor W. F. G. Swann, retiring chairman of Section B, and Professor John W. Miller, chairman of Section D, presided. The first address of this session was given by Professor H. N. Russell, of Princeton University, on the subject, "Stellar evolution." The speaker described the recent theory of Professor Eddington and its relation to Russell's earlier work. The essential feature of Eddington's theory is the hypothesis that in the interior of a star the outer electrons of the atoms are removed, so that the atoms may be very much more closely packed together than was previously assumed. This leads to a consideration of gases many times more dense than the heaviest known element on the earth and gives the typical star a much longer life than was previously estimated. Professor Archibald Henderson, of the University of North Carolina, gave an address, entitled "Is the universe finite?" which is briefly outlined in the report of the meeting of the Mathematical Association of America, to follow. Professor Russell read a paper by Dr. E. P. Hubble, of Mt. Wilson Observatory, on "The distance of the spiral nebulae." In this paper Dr. Hubble described how he had been able to separate the aggregate of stars around the edges of the spiral nebulae into star clusters and thus to get an estimate of the distance of the spiral nebulae from the earth. The estimated distance is enormous, being of the order of magnitude of 1,000 light years. The reader emphasized the value of this paper as giving direct experimental information on the question of the size of the universe.

In the general exhibition there were books and models of interest to mathematicians. In particular, there were exhibits of the publications of the American Mathematical Society and of several publishers, including books on advanced mathematics. The exhibits of calculating machines, such as the Mercedes, the Millionaire and the Monroe, also proved interesting to mathematicians. The very fine exhibit of the Coast and Geodetic Survey, for which Dr. W. D. Lambert was responsible, was of unusual interest.

Professor J. C. Fields, chairman of Section A, who was prevented by illness from attending the meeting, sent a telegram of greetings to the mathematicians assembled in Washington.

This meeting was specially marked by the second award of the Bôcher Memorial Prize, for a memoir published in the society's *Transactions;* the prize was equally divided between E. T. Bell, of the University of Washington, for his paper entitled "Arithmetical paraphrases," and S. Lefschetz, of the University of Kansas, for his paper entitled "On certain numerical invariants of algebraic varieties with application to abelian varieties." On Tuesday evening the second Josiah Willard Gibbs lecture was delivered by Robert Henderson, vice-president of the Equitable Life Assurance Society, who spoke on "Life insurance as a social service and as a mathematical problem." The retiring address of President Veblen, entitled "Remarks on the foundations of geometry," was delivered at the joint session on Wednesday morning. His paper dealt with the following topics: The relation between matter and space, geometry of paths, the choice of undefined terms, postulates for analysis situs and the arithmetic point of view. Both Mr. Henderson's and President Veblen's papers will be published in full in the *Bulletin of the American Mathematical Society.* This meeting was probably the largest in the history of the society, with regard to both attendance (more than 150) and number of papers on the program. At the regular sessions of the society 56 papers were presented by 39 authors, on the theory of numbers, algebra, analysis, the foundations of mathematics and mathematical astronomy and physics. Authors of these papers represented 11 states (including California and Texas as well as the east and middle west) and Canada; an important paper was presented by Professor C. de la Vallée Poussin, of the University of Louvain, entitled "Sur les fonctions indéfiniment dérivables." A joint dinner of the society, the Mathematical Association and Section A of the American Association for the Advancement of Science was held at the Franklin Square Hotel on Thursday evening, with Professor J. L. Coolidge as toastmaster; the attendance was over one hundred.

### SECTION B (PHYSICS)

*Vice-president and chairman,* K. T. Compton.
*Retiring vice-president,* W. F. G. Swann.
*Secretary,* S. R. Williams, Amherst College, Amherst, Mass.

(*Report by S. R. Williams*)

Section B participated in two joint sessions. The first was with the American Physical Society, Section D and the American Astronomical Society, on Tuesday afternoon, with Vice-president Compton presiding, at which was given the address of the retiring vice-president, Professor W. F. G. Swann, of Yale University. His subject was: "The trend of thought

in physics." The second joint meeting in which Section B took part was on Thursday morning, with Sections A and D, the American Mathematical Society, the Mathematical Society of America and the American Astronomical Society.

SECTION C (CHEMISTRY)

*Vice-president* and *chairman,* F. G. Cottrell.

*Retiring vice-president,* E. W. Washburn.

*Secretary,* W. D. Harkins, University of Chicago, Chicago, Ill.

(*Report by Gerhard Dietrichson, assistant secretary*)

A joint meeting of the Washington and neighboring sections of the American Chemical Society, together with Section C of the A. A. A. S., was held during both the forenoon and afternoon of Tuesday, December 30, to Friday, January 2, inclusive. The Thursday session was devoted largely to a symposium on X-rays and crystal structure, in which a number of physicists also took part. The sessions throughout were well attended and much interest was evidenced in the various papers presented, of which there were about 40. These represented a wide and well-selected range of subjects. An important feature of the meeting was that sufficient time, in many cases as much as one hour, was allowed for the presentation and discussion of each paper. On Thursday evening a dinner was held at the Cosmos Club, which was attended by about fifty chemists.

The address of the retiring vice-president, E. W. Washburn, of the National Research Council, was devoted to a detailed discussion of some effects of the atmosphere upon various physical measurements. The latter included in particular the effect of dissolved air upon the thermometric ice-point, a comparison of static and dynamic methods for vapor pressure measurements, the determination of specific heats at constant volume and at constant pressure, and a differentiation between three distinct types of heats of vaporization. Dr. Washburn's address was published in the issue of SCIENCE for January 16.

One of the most interesting papers was that presented by Dr. W. H. Eddy, of Columbia University, on the activity of bios. Dr. Eddy described the successive steps in the fractionation and purification of bios as the result of which a crystallin product was obtained which appears to be closely related to vitamin B. The bios crystals were found to have a decided temperature coefficient. Dr. Eddy also called attention to the multiplicity of bioses as indicated by experiments carried out at the University of Toronto and at Columbia University. The sulphur amino acid, $C_6H_{11}NSO_2$, obtained by *J.* H. Muller, was found to be only slightly less active than the crystallin product $C_6H_{11}NO_3$, obtained by Dr. Eddy. Professor W. A. Noyes, of the University of Illinois, related his experiences in Europe during the past year. He commented regarding the seemingly greater tendency in European universities to consider qualifications for independent research rather than teaching ability in the appointment of professors. He concluded by telling about his activities in connection with efforts to restore normal international relations with German and Austrian chemists. Dr. A. L. Day, of the Geophysical Laboratory, gave a paper on the causes of volcanic activity. He spoke of temperature variations of the lava lake in Mt. Lassen and Mt. Kilauea and called attention to the surprising variation in composition of the gases evolved. The theory proposed by Dr. Day is to the effect that volcanic action does not indicate a molten condition of the earth's interior but results from the crystallization process which takes place upon the gradual accretion of water to highly supercooled silicates.

The subject of atomic structure very properly made up a considerable part of the program for the meeting. Dr. Harold C. Urey, of the Johns Hopkins University, discussed the relation between the static and the dynamic concepts of the atom. Dr. Urey showed that within the atom the electronic orbits can be described with a high degree of approximation by assuming that each electron is moving in a static field of force. It may be that the best method of describing the atom is not by the use of the idea of a static field of force, but at least this is one way. Dr. Charles P. Smythe, of Princeton University, discussed the electric moments of molecules. Dr. Smythe pointed out that when the centers of gravity of the positive and of the negative charges in the molecule coincide the arrangement of the charges is symmetrical and the field of force around the molecule is small, but when they do not coincide the molecule may be regarded as containing an electric doublet, two charges equal in size but opposite in sign and very close together. The size of this doublet, which gives rise to an electric field around the molecule, is measured by its moment, the value of which has been calculated by a new method for the molecules of a large number of inorganic and organic substances, from experimental data. These values of the moment are found to be in agreement with our theories of structure. Another interesting paper was presented by Dr. Robert S. Mulliken, of Harvard University, on the interpretation of band spectra; *i.e.*, spectra of molecules. Dr. Mulliken called attention to the important part played by the quantum theory in the interpretation of line spectra, or the spectra of atoms. In a similar way it appears that the quantum theory will be of much help in a study of the structure of molecules. As yet the theory has been applied to only a moderate number of relatively simple substances in the gaseous state. One of the striking results obtained so far is an explanation of the transitory existence of certain molecules never found by chemists,

as for instance, $He_2$ and CN. The quantum theory also makes possible a determination, by means of the spectrum of a molecule, of the exact distance apart of its component atoms, the exact rate at which they vibrate when properly stimulated and also the forces holding them in place. The spectral relations of molecules made up of atoms having isotopes was also discussed, with reference to the possibility of detecting the existence of isotopes. Dr. Karl T. Compton, of Princeton University, told about the different types of excited atoms and explained how they may be produced through electronic impact and light absorption. He emphasized the importance of band spectra in the study of excited atoms and concluded by describing experiments that have been carried out by Dempster and Kannenstein for determining their period of existence. Dr. Arthur H. Compton, of the University of Chicago, spoke about the scattering of X-rays as having furnished us with our first knowledge of the number of electrons in different atoms. The arrangement of these electrons in various atoms has been studied by comparing the observed intensity of scattered X-rays with the intensity calculated for different arrangements of the electrons. The intensity of the reflection of X-rays by crystals has also been used to determine the distribution of the electrons. Recent work has however cast doubt on the wave theory of X-rays, which is the fundamental basis of this work. The wave-length of scattered X-rays differs from that of the primary rays; this receives a complete explanation on Einstein's idea of radiation quanta. When X-rays are scattered, electrons should recoil from the scattered quanta, and such recoiling electrons have actually been observed.

Dr. R. W. G. Wyckoff, of the Geophysical Laboratory, reviewed the progress in the study of the internal structure of crystals by means of X-rays, which makes possible a determination of the elements of symmetry. Dr. Edgar T. Wherry, of the Department of Agriculture, discussed the subject of isomorphism and atomic dimensions, calling attention to the fact that the seemingly decisive factor in determining isomorphism is that of the atomic domain. Examples were cited of substances having a similar crystalline structure and still exhibiting a lack of isomorphism. In order to make the arrangement of atoms in the crystal more readily understandable, Dr. Wherry recommended that planes be passed midway between the points so as to outline polyhedrons representing an assemblage of atomic domains. Dr. W. P. Davey, of the General Electric Company, presented a paper on atomic and ionic radii. Dr. Davey discussed the two methods of packing that give the closest arrangement of spherical atoms; *i.e.*, the face-centered cube and the body-centered cube. In view of experimental results showing that atomic hydrogen will permeate cold alpha iron it is concluded that the body-centered cubic structure of the latter has tunnels running through it which are big enough for atomic hydrogen to pass through but which are too small for molecular hydrogen. The shapes and sizes of various kinds of atoms and ions were discussed in detail. Dr. Ancel St. John, of New York City, described many interesting applications of X-rays in studying the structure of pure metals and alloys. Dr. M. S. Kharasch, of the University of Maryland, discussed a number of reactions involving unsymmetrical organic compounds for establishing the degree of electronegativity of various radicals. Dr. R. A. Baker, of Syracuse University, presented a study on the status of the electron in the teaching of high school and college chemistry. Much difference of opinion was encountered with regard to the emphasis to be placed on this aspect of the subject in beginning courses. Dr. Charles A. Kraus, of Brown University, gave an excellent address on the properties of compound substances in the metallic state. He pointed out that these substances, such as $SnNa_4$, for example, may be considered as salt-like in character which would indicate that most of the chemical elements are amphoteric. The amphoteric character of certain organic radicals was also discussed.

A paper on solvated systems by Dr. Harry N. Holmes, of Oberlin College, aroused a great deal of interest. When insoluble substances are formed the product is called a gel if all the liquid present is held as a solid but a gelatinous precipitate if only a part of the liquid is held. Demonstrations of various gels were given. Dr. Holmes also described the natural formation of quartz from prehistoric gelatinous silicic acid. Many gels when properly dried to a low water content become extremely porous with marked capacity for taking up certain gases. Patrick's silica gel and the Holmes-Anderson improved form are examples. There are many important industrial as well as theoretical applications of adsorption and capillary condensation by gels. Dr. F. Russell v. Bichowsky, of Johns Hopkins University, spoke about the present status of thermochemical data, emphasizing the importance of securing more accurate data, and appealed for a new interest in the subject. It was pointed out that much of the needed work is such that it may possibly be undertaken by a government organization rather than by universities.

Oxidation-reduction indicators formed the subject of a paper presented by Dr. Mansfield Clark, of the Hygienic Laboratory. Extensive data were given for electrode potential differences in solutions of various dyes and their reductants at different pH values. A simple device was shown for developing equations applicable to each individual case. The fact that the levels of energy intensity associated with the two

equivalents involved in the oxidation-reduction of a given dye are exactly the same for each equivalent and the fact that the hydrogens associated with the acidic properties created in the reductant have enormously different ionization constants, lead inferentially to the conclusion that Wieland's theory of hydrogen transport is inadequate. A simpler concept is found in the transport of electron-pairs followed or not followed by the binding of H-ions, according to the acid-base conditions of the solution.

Dr. Eugene C. Bingham, of Lafayette College, discussed recent studies on the flow of matter. The fundamental formulas for elastic deformation, viscous and plastic flow were discussed and shown to be quite distinct and independent. Dr. William Blum reviewed the work on electroplating that is being done at the Bureau of Standards. He emphasized the importance of studying dynamic rather than static electrode potentials in determining the best conditions for good "throwing power" and a suitable structure of the deposit. Dr. F. O. Rice, of the Johns Hopkins University, spoke on catalysis in homogeneous systems involving certain slow organic reactions. Two suggestions were made with regard to meeting the difficulties encountered. The first was that of assuming the existence of "residual molecules" and the second that of applying the law of mass action to the actual equilibria which may be considered to exist in the solution rather than to the ordinary stoichiometric equation representing the reaction. Dr. R. C. Wells, of the U. S. Geological Survey, discussed the chemistry of native copper deposition.

The following titles represent additional interesting papers that were given at the sessions: "Some observations on ammonia catalysts," by Dr. J. A. Almquist, of the Fixed Nitrogen Research Laboratory; "Studies on hydrofluoric acid: 1. Compounds of hydrofluoric acid with organic bases," by Dr. Raymond M. Hann, of the Bureau of Chemistry; "The influence of sulphur on the color of dyes," by Dr. E. Emmet Reid, of the Johns Hopkins University; "The determination of oxygen and hydrogen in metals by vacuum fusion," by Drs. Louis Jordan and J. R. Eckman, of the Bureau of Standards; "The titration curve of 'arsenoxide,'" by Dr. R. K. Cannan; "Some principles of the alum process for the clarification of water," by Dr. L. B. Miller; "Some new hydazines," by Drs. H. D. Gibbs and W. L. Hall; "A delicate test for phenols," by Dr. H. D. Gibbs; "Products of the dry distillation of Steffen waste water," by Dr. W. J. Geldard; "The effect of temperature and time of storage on the physical properties of undeveloped brown-print paper," by Drs. T. D. Jarrell and F. P. Veitch; "The caking of fertilizer salts," by Drs. A. R. Merz and W. H. Ross.

## SECTION D (ASTRONOMY)

*Vice-president and chairman,* John A. Miller.

*Retiring vice-president,* Heber D. Curtis.

*Secretary,* F. R. Moulton, University of Chicago, Chicago, Ill.

(*Report by F. R. Moulton*)

Section D held two joint meetings. The first was with Section B on Tuesday afternoon, when Professor W. F. G. Swann gave his retiring vice-presidential address for Section B on "Trend of thought in physics," and Professor H. D. Curtis gave his retiring vice-presidential address for Section D on "The equinox of 1950." The second joint meeting was with sections A and B, on Thursday morning, when Professor Henry Norris Russell gave an address on "Stellar evolution," and Professor Archibald Henderson gave an address entitled, "Is the universe finite?"

The title of the address of Professor Curtis led many to expect that he would discuss the technical question of the choice of an equinox and reference lines, a problem that must be considered because the plane of the earth's equator is slowly changed by the attractions of the moon and sun upon the earth's equatorial bulge. He did, indeed, refer briefly to this subject, but his address was chiefly upon the probable progress of astronomy in the quarter century from 1925 to 1950. His discussion and also that of Professor Russell made clear the rapidity with which the views of astronomers have recently been changed, upon such questions as the dimensions of the Galaxy, the duration of stars and cosmic evolution. Speaking of possible developments in astronomical instruments, Professor Curtis asked his hearers to "dream" of a dry plate one hundred times as sensitive as any now in use. Such an improvement would be equivalent, for photographic purposes, to making the Lick telescope 30 feet in diameter and the 100-inch reflector on Mount Wilson more than 80 feet in diameter. He said that the maximum efficient size of refractors seems not to exceed 48 inches, and of reflectors sixteen feet. Consequently, there is more hope in the improvement of photographic plates, and in extensions of the use of the interferometer and the photoelectric cell than in the enlargement of refractors or reflectors. The speaker sees little probability of a great increase in our knowledge of the moon, planets or comets in the next quarter century. But he thinks it likely that many of the puzzling problems presented by the sun may be solved. Geological evidence shows that our sun must have been radiating almost exactly at its present rate for at least two hundred million years. In fact, many astronomers have just now become willing to admit that the life period of a star is a matter of trillions, rather than millions, of years. It is suggested that the source of the sun's radiant

energy may be sub-atomic, an idea that has been current among some astronomers for more than a decade. This same point was referred to by Professor Russell, who quoted from MacMillan, Jeans and Eddington the thought that the sun's mass is in a sense changed to energy and radiated away. Such a suggestion is in harmony with some of the implications of the general relativity theory. According to this suggestion, the sun's mass is being decreased at the rate of about 4,000,000 tons per second—a rate, by the way, that will not appreciably alter its size or rate of radiation for ten thousand million years. Increase in knowledge of stellar astronomy has been rapid in recent years. Professor Curtis said that astronomers now use in discussing our Galaxy units of a thousand light years. He then expressed himself as regarding many of the spiral nebulas as exterior galaxies of millions of stars, in general characteristics similar to our own. This conception, for which there is much evidence, leads on to that of vast systems of galaxies, or milky ways, which may, in turn, be units in still larger cosmic organizations. Professor Curtis believes the next quarter of a century will witness a great extension of our knowledge of these questions and an improvement of our theories of them. He maintains, however, that our views should be based primarily on the average, or dominant, type of celestial object rather than upon exceptional ones.

The address of Professor Russell will be printed in *Popular Astronomy*. It contains an account of the author's own work upon stellar evolution, and the modifications that have been introduced by Iaka on the ionization of the elements in stars and by Eddington's researches on the internal constitution of stars.

Professor Henderson's address gave a summary of the attempts that have been made to determine the radius of the physical universe on the basis of general relativity. A number of lines of approach indicate for this quantity a distance of the order of $6 \times 10^{12}$ times the distance from the earth to the sun, approximately the distance light travels in one hundred million years.

### SECTION E (GEOLOGY AND GEOGRAPHY)

*Vice-president and chairman,* W. C. Mendenhall.

*Retiring vice-president,* N. M. Fenneman.

*Secretary,* E. S. Moore, University of Toronto, Toronto, Ontario.

*(Report by E. S. Moore)*

The sessions of Section E occupied four days, Tuesday to Friday, inclusive, with one evening session. Wednesday and Thursday afternoons were set aside for visits to the Carnegie Geophysical Laboratory, the map printing and engraving establishment of the U. S. Geological Survey and the National Museum. Our thanks are due to our Washington hosts for their hospitality during the entire meeting of the section. On Tuesday evening Section E and the Association of American Geographers had a very enjoyable dinner at which 118 persons were present. W. C. Mendenhall presided and the addresses of the retiring officers were presented. C. F. Marbut, retiring president of the Association of American Geographers, delivered his address on "The promulgation, decline and renaissance of Malthusianism and its relation to the character and geographic distribution of the soil." The title of Professor Fenneman's retiring address was "A classification of natural resources." These addresses will both be printed in the near future. Thursday forenoon was mostly occupied with reports of committees. The chairmen of six of the committees of the Division of Geography and Geology of the National Research Council presented interesting reports on their work, and David White, chairman of the division, spoke for the work of the division as a whole. The report of the committee on "Geology in city parks" was presented by E. S. Moore. The report showed that some progress had been made since the last report. Probably the most prominent feature of the reports from the National Research Council was the description by F. E. Wright of a light, portable apparatus that he has recently designed for the rapid and accurate determination of gravity. It is expected to measure variations in gravity with an accuracy of one part in one million and to make possible studies in isostasy which have hitherto been impossible. Friday forenoon was set aside for a symposium on "Ancient climates" and a series of excellent papers was presented. It is hoped that these papers will appear in the *Popular Science Monthly* at an early date. In the number and quality of the papers presented and in the variety of its interesting features the Washington meeting of Section E was quite an outstanding one.

### SECTION F (ZOOLOGY)

*Vice-president and chairman,* Edwin Linton.

*Retiring vice-president,* Edward L. Rice.

*Secretary,* Herbert W. Rand, Harvard University, Cambridge, Mass.

*(Report by Herbert W. Rand)*

In accord with the practice which has prevailed for several years, no program of papers was presented by Section F as such. The zoological part of the association meeting was arranged under the auspices of the several special societies related to the section. The outstanding event for which Section F was responsible was the address of the retiring vice-president of the section, Dr. Edward L. Rice, of Ohio Wesleyan University. The address, entitled "Darwin and Bryan

—a study in method," was given in the afternoon of Tuesday, December 30, to an audience which quite filled the seating capacity of the spacious girls' gymnasium of the Central High School. The address was itself an admirable example of the method which, the speaker urged, should dominate all endeavor toward truth, whether in the field of science or in that of religion. It was a calm open-minded unbiased review of the issue, devoid of sarcasm and ridicule, tolerant and courteous in every allusion to those who are unable to accept the doctrine of evolution. The address was in the main, as the title indicated, a comparison of the methods of thought and deduction exhibited by Mr. William J. Bryan in his spectacular oratorical attacks upon the idea of evolution with Charles Darwin's painstaking, patient, laborious accumulation of facts, from the critical evaluation of which, by employment of most stringent logic, certain deductions could be made. He said:

> Mr. Bryan's main attack is an argument deduced from the assumption of the literal accuracy of the Bible in general and of the first two chapters of Genesis in particular. This assumption is not biblical; it was not uniformly accepted in the early church, nor is it accepted by the leading Bible scholars of to-day.
>
> Darwin's work on the contrary is based upon a hypothesis, or what Mr. Bryan terms a "guess," followed by the most complete verification and leading to a degree of probability amounting to practical certainty.
>
> Dr. Rice urged a higher degree of tolerance and open-mindedness, not only in the opponents of the evolution idea, but also on the part of those engaged in scientific research.
>
> The dogmatic method of Mr. Bryan is happily not followed by all theologians; nor, unhappily, does Darwin's scientific method characterize all his followers. It is to be hoped that the outcome of the present controversy may be the alliance of a more scientific religion and a more religious science.

Following Dr. Rice's address, the annual business meeting of Section F occurred, with President Linton acting as chairman. To succeed Professor Henry B. Ward, the retiring member of the section committee, the section elected, for four years, Professor S. O. Mast, of Johns Hopkins University.

The biologists' smoker, arranged by the Union of Biological Societies with cooperation by the American Association, was held at the New National Museum on Monday evening, following the opening general session of the association.

### SECTION G (BOTANICAL SCIENCES)

*Vice-president* and *chairman,* G. R. Lyman.

*Retiring vice-president,* Charles J. Chamberlain.

*Secretary,* Robert B. Wylie, University of Iowa, Iowa City, Iowa.

*(Report by Robert B. Wylie)*

A joint session with the Botanical Society of America, the American Pathological Society and the American Society of Plant Physiologists was held on Tuesday afternoon. This program had been organized under the direction of the section committee and was designed to present recent investigations in certain divergent lines of work with plants. The vice-presidential address, on "The origin of the Cycads," given by Dr. Charles J. Chamberlain, brought forward important generalizations from his long-continued studies in this group. In considering the possible origin of these plants a hypothetical ancestor was assumed combining well-established features of several Paleozoic forms. From such ancestor he would derive as divergent lines the Mesozoic Bennettitales and the modern Cycadales. The former were characterized by the reduction of lateral pinnae and retention of the terminal ovule of the megasporophyll; the latter by reduction of upper pinnae and retention of lateral ovules. This conclusion depends in large measure upon the fundamental principle of paleontology that parts once lost during phylogeny can not be regained. Dr. J. E. Weaver discussed his investigations on roots, in particular the habits of grassland vegetation of the great plains. About 90 per cent. of the species of this region are rooted well below 2 feet and often as deep as from 12 to 22 feet. The rate of growth of roots is often as much as one half inch per day, and, as in the major roots of corn, may be as much as two or two and one half inches per day. Variations in roots in different types of soils, the total extent of root systems and the persistence of root-hairs were also discussed. Dr. E. J. Kraus discussed soil nutrients in relation to vegetative growth and reproduction. After reference to methods of work in this field he described some striking results based on chemical analysis, with relation to nitrate and carbohydrate content, illumination, etc. Nitrate nitrogen within the plant is not a necessary accompaniment to the vegetative condition, but in many instances may well be regarded as are the unmetabolized nitrogenous reserves. Dr. L. O. Kunkel took up the present status of mosaic and related diseases. Such disturbances are so different from other plant maladies that it seems necessary to suppose that they are due to a special kind of pathogen. The agent producing mosaic disease is thought to be corpuscular. It may not be ultra-microscopic, for plasticity rather than size may account for its filterability. It was suggested that our knowledge of these obscure but important diseases may be advanced by studies on host relationships, on insect carriers and on the intra-cellular amoeboid bodies associated with many different mosaic diseases.

SECTION H (ANTHROPOLOGY)

*Vice-president* and *chairman,* E. A. Hooton.
*Retiring vice-president,* E. A. Hooton.
*Secretary,* R. J. Terry, Washington University School of Medicine, St. Louis, Mo.

(*Report by R. J. Terry*)

Beginning with the St. Louis meeting at the close of 1919, Section H has continued to devote its activities to a program chiefly of physical anthropology, other branches of the subject being cared for by the several societies affiliated with the section. At the recent Washington sessions of the section there were twenty-six titles presented, the majority dealing with some aspect of physical anthropology. The meeting began at the George Washington University, on Thursday evening, January 1, with a symposium before a joint session of Sections H and I, on "Tests of immigrants," which was presided over by the vice-president for the section, Dr. E. A. Hooton. The speakers invited from the two sections were Drs. Carl C. Brigham and R. S. Woodworth, Professor Franz Boas and Dr. Aleš Hrdlička. An interesting discussion was developed around the methods in use for testing and the physical and mental conditions encountered among foreigners coming to America. About two hundred and fifty members and guests were present at this meeting. The second and third meetings, held in the New National Museum Friday and Saturday forenoons, included titles covering a broad range of physical anthropological research, from studies of prehistoric man, such as Miss Ruth Sawtell's "Azilian skeletons," to what might be called applied anthropology in the papers of Dr. Charles B. Davenport on "Mongolians and Mongoloids," Dr. W. W. Graves, on "Scapular types," and Dr. Louis Berman, on "Endocrine glands." Professor Miloslavick demonstrated anthropological features of the large intestine, discovered among central Europeans; further contributions on the weight of organs were presented by Professor Bean, and the anthropological position of the Armenians was defined by Professor Boas. Mr. H. L. Shapiro's study of the racial hybrids of Norfolk Island, with pictures of the descendants of the mutineers of Pitcairn Island, was a most interesting contribution. This, together with Dr. Truman Michelson's paper on the physical features of the Samoans, Tongans and Marquesans, and Dr. A. I. Hallowell's "Measurements of Labrador Indians," brought forth an animated discussion. A paper of unusual interest was ably presented by Dr. Adolph Schultz, on "The evidence of variability in fetal and adult life," indicative of the hereditary nature of several forms of variation which had been determined quantitatively. Interesting contributions in other branches of anthropology were the following: Miss H. Sewell Wardle on "The scope of the rite of adoption," M. Stansbury Hagar on "Symbolism of the Portsmouth works," Dr. D. Sutherland Davidson on "Theories of social organization in Australia," Dr. J. Walter Fewkes on "The archeology of Florida" and Dr. Anita Newcomb McGee on "The length of a human generation," the last being a critical review of the opinions of statisticians who have dealt with this question. The attendance averaged one hundred and ten at the Friday and Saturday sessions and discussion of papers was, in general, spontaneous and spirited. The social feature of the meeting, the anthropologists' dinner Friday evening, was attended by sixty members and guests, Dr. J. Walter Fewkes presiding.

SECTION I (PSYCHOLOGY)

*Vice-president and chairman,* R. S. Woodworth.
*Retiring vice-president,* G. Stanley Hall, *deceased.*
*Secretary,* Frank N. Freeman, University of Chicago, Chicago, Ill.

(*Report by Frank N. Freeman*)

Section I held a single session, jointly with Section H (Anthropology), the rest of the psychology program being in charge of the American Psychological Association. The subject of the joint program was "Tests of immigrants." Frank Boas, R. S. Woodworth, Aleš Hrdlička and Carl Brigham took part. The next meeting of Section I will probably occur next December 30th and 31st and January 1st, at Kansas City. It is hoped that some psychologists who attend the Ithaca meeting of the Psychological Association next year will be able to attend part of the section meeting. It is planned to hold two joint sessions with Section Q (Education).

SECTION K (SOCIAL AND ECONOMIC SCIENCES)

*Vice-president* and *chairman,* Thomas S. Baker.
*Retiring vice-president,* John F. Crowell.
*Secretary,* Frederick L. Hoffman, Wellesley Hills, Mass.

(*Report by Frederick L. Hoffman*)

The sessions of Section K were unusually well attended and the discussions emphasized a deep interest in the topic for this year's program, "New problems of western civilization." The first address was by Dr. John Franklin Crowell on "The development of modern family life," bearing directly upon questions concerned with the evolution of the family in the light of the historical facts of the past. The next speaker was Dr. Thomas S. Baker, president of the Carnegie Institute and vice-president for the section, who spoke on "The rights of the unintelligent." Dr. Baker's address attracted considerable attention and proved a thoughtful contribution to a

much neglected phase of the psychology of the crowd. Mr. Waldo G. Morse read a paper on "The law—in its relation to society," suggesting far-reaching reforms, tending towards clarification and simplification, for which the outlook unfortunately is not very encouraging. The next three papers had to do with the "Conservation of vision," "The economic aspects of heart disease" and "The comparison of races," the latter by Mr. James Gregg, of the Hampton Institute. Mr. Gregg's paper emphasized the conclusion that there is no fundamental, intrinsic difference in the native ability of different races, eliciting a considerable and more or less divergent discussion. Dr. Roswell H. Johnson read a paper on "The use of median as a minimum requirement of international migration."

The outstanding address of the meeting was on "Conservation in the paper and pulp industry," by Dr. H. S. Graves, of Yale University. Dr. Graves, who was formerly chief forester of the United States government, brought to bear an immense experience and thoughtful reflection upon a question of the utmost concern to the nation. All his points were fully illustrated by reference to the actual facts of the situation, suggesting a decidedly more active interest on the part of the public in the problems presented.

"Employee representation" was the subject of an address by Dr. Henry C. Metcalf. Professor Leonard D. White discussed the subject of "Scientific research and state government." A paper on "The ethics of trade organization" was presented by Mr. J. George Frederick, which also attracted considerable attention. Professor John A. Fairlie's paper was on "Some phases of British administrative legislation," the session for the day concluding with an address on "Glances at population problems of South America," by Mr. William A. Reid, of the Pan-American Union. This paper emphasized the great future possibilities of settlement and development in South America, different viewpoints being presented in the discussion as regards the broadening of our American interests in Latin-American countries.

On the last day Miss Bertha Luckey discussed "Racial differences in mental ability," while Mr. Frank M. Phillips presented an admirable address on "Modern schools and playgrounds." Miss Luckey's paper amplified observations of Mr. Gregg and was also subjected to considerable discussion. Professor E. A. Kirkpatrick presented an address on "Marriage laws and race betterment," the morning session concluding with "Some observations on the American physique," by Dr. Frederick L. Hoffman. The last session included four papers, the first being on "The practical significance of the Boy Scout movement," by Mr. Colin H. Livingston. All present were delighted with the comprehensive presentation of the facts regarding this important movement in the training of young boys for manhood and the active duties of life. A paper on "The plan and scope of the Y. M. C. A," unfortunately could not be read on account of the speaker's absence. Along a similar line was a paper on "The national Catholic welfare congress," by Dr. Frederick Seidenburg, illustrating a wide range of useful activities, and comprehending a thoroughly well-thought-out plan of welfare organization, under the directive influence of religious training and ideals. Dr. Joseph Mayer, of Tufts College, presented a very thoughtful discussion on "Modern business education and research," emphasizing the importance of research as an educational basis in the training of young men for executive or directive functions in business or administration. The last paper was on "The quality of population and food supply," by Professor Rudolph M. Binder. It reemphasized many well-known viewpoints in a condensed form, suggestive of the necessity of considering the future in our present-day developments.

The section officers for next year are: *Vice-president* and *chairman,* Professor Fred R. Fairchild, Yale University; *secretary,* Dr. Frederick L. Hoffman, Wellesley Hills, Mass. The section committee consists of: Professor Wm. B. Bailey, retiring end of 1925; Dr. H. S. Graves, retiring end of 1926; Dr. John Franklin Crowell, retiring end of 1927, and Mr. Maurice Holland, retiring end of 1928.

### *The Metric Association*

*President,* George F. Kunz.

*Secretary,* Howard Richards, 156 Fifth Ave., New York City.

No report has been received, but it may be noted that the Metric Association meeting was this year better attended and more active than ever before. The organization arranged a striking exhibit in the general exhibition, showing metric instruments and metric methods.—B. E. L.

### *The American Political Science Association*

*President,* James W. Garner.

*Secretary,* Frederic A. Ogg, University of Wisconsin, Madison, Wis.

(*Report by Frederic A. Ogg*)

The twentieth annual meeting of the American Political Science Association was held in Washington, December 29 to 31. The registration was 136, and the number of members actually in attendance was probably not less than 160. Attendance at the various sessions was without exception excellent. Departing from custom, the association met apart from both the

American Historical Association and the American Economic Association, and found much interest in meeting along with the American Psychological Association and other organizations affiliated with the American Association for the Advancement of Science. Notable features of the program included a series of six round tables, meeting on the successive forenoons of the meeting and devoting themselves to fruitful discussion of selected aspects of political sceince and public affairs. This feature was an experiment in the form in which it was carried out, but was generally regarded as thoroughly successful. Other important features were the address of the British ambassador, the presidential address of Professor James W. Garner, of the University of Illinois, a joint session with the psychologists and a series of interesting luncheon conferences on the three days of the meeting. The committee on instruction presented a valuable report on state legislation requiring the teaching of the constitution or general instruction in civics or American history. The American Council of Learned Societies Devoted to Humanistic Studies presented to the Political Science Association, as one of the twelve constituent organizations, announcements of several important projects in hand, that of largest general interest being the preparation of a twenty-volume Dictionary of American Biography, made financially possible by a subvention of half a million dollars recently tendered by the New York Times Company. The preparation and publication of this dictionary will be under the immediate direction of a committee composed of four representatives of the American Council of Learned Societies, two appointees of the New York Times Company, and a managing editor to be chosen by these six persons. Another interesting announcement was made by the association's representatives in the Social Science Research Council to the effect that the Laura Spelman Rockefeller Memorial has agreed to provide a liberal sum of money to be used, beginning in 1925–26, for research fellowships of an advanced character in the field of social sciences. Officers for 1925 were elected as follows: *President,* Charles E. Merriam, University of Chicago; *first vice-president,* A. R. Hatton, Western Reserve University; *second vice-president,* Raymond Moley, Columbia University; *third vice-president,* Charles G. Haines, University of Texas; *secretary-treasurer,* Frederic A. Ogg, University of Wisconsin.

SECTION L (HISTORICAL AND PHILOLOGICAL SCIENCES)

*Vice-president* and *chairman,* Louis C. Karpinski.

*Retiring vice-president,* Florian Cajori.

*Secretary,* Frederick E. Brasch, Smithsonian Division, Library of Congress, Washington, D. C.

Section L now consists of two rather distinct groups, each operating through a special committee of the American Association. Until this year the Committee on the History of Science has acted as the section committee for the section, but now the philological group is well organized and the section is operating somewhat as two organizations. The programs prepared by the two committees are reported below.—B. E. L.

*The Committee on the History of Science*

*Chairman,* Louis C. Karpinski.

*Secretary,* Frederick E. Brasch, Smithsonian Division, Library of Congress, Washington, D. C.

(*Report by Frederick E. Brasch*)

The program on the History of Science for the fifth Washington meeting was arranged jointly by the association's committee on this subject and the newly formed History of Science Society, with cooperation of the American Historical Association. On account of the joint character of the sessions they are reported under the society below.

*The Committee on Philological Sciences*

*Chairman,* W. A. Oldfather.

*Secretary,* Mark H. Liddell, Purdue University, Lafayette, Ind.

(*Report by the secretary*)

The Washington session on philological sciences was the third and most interesting meeting the committee has arranged. Outstanding features of the program were as follows:

The Thursday morning program, Dr. Joseph Dunn in the chair, opened with a brief summary of the modern scientific and historical data bearing upon the origins and linguistic affinities of the Celts. Dr. Dunn called especial attention to the rich field of language material found in early Irish. Professor Thomas Fitzhugh discussed with copious illustrations the original rhythmic elements of Latin and Greek verse forms. An account of the aims and methods of the new project for the "Dictionary of Medieval Latin," recommended by the committee and recently endowed by Mr. Ochs, of the New York *Times,* was presented by Professor J. L. Paetow, its original proposer. The afternoon session, Professor Fitzhugh in the chair, opened with a discussion by Professor G. M. Bolling, of the bearing of newly discovered papyri on the text of Homer, together with some ingenious restorations of these very dilapidated fragments. There followed a paper by Professor Robert H. Hiller, on the emotional significance of the common Greek particle usually translated "indeed"; and another by Professor S. G. Oliphant, who pointed out with some humor that the Greek work for "cattle," which is usually explained as being derived from a compound

meaning "moving forward," owed its origin to the fact that it was originally applied to sheep, and recorded their peculiar habit of grazing forward against the wind, as observed by modern sheep-herders. Professor D. A. Penick then discussed Paul's Greek style in its relation to the Pauline authorship of the Epistles, and was followed by Professor Steele who vigorously and convincingly protested against vocabulary percentages alone as a means of determining authorship. In the early part of the Friday session, devoted to the general problems of linguistics, Professor Leonard Bloomfield called attention to some interesting analogies between the Indo-European languages and those of the American Indians, and emphasized the need of better training and wider outlook on the part of students of language problems. Professor Frank R. Blake drove home Dr. Bloomfield's point with a paper on the importance for linguistic study of the lesser known families of speech. Professor George F. Flom then presented an analysis of the Old Norse elements in the little known dialect of Shetland. There followed an interesting series of X-ray lantern slides by Professor G. Oscar Russell, which went to show that our current ideas of phonetics, depending upon the assumption that given vowel tones were made in the same way by all speakers, was a fallacy, and that our current phonetics based upon these assumptions would have to be modified accordingly. In the discussion of this interesting paper it was pointed out that recent work in acoustic physics was rapidly furnishing the material for new scientific conceptions of language based upon mathematcial and physical laws; and that to forward this new phonetics by making the recently perfected instruments of precision accessible to students of language was the chief reason for the committee's recommendation of the project for a National Laboratory of Phonetics presented at the Cincinnati Conference last year. The afternoon session, Professor O. F. Emerson in the chair, followed an informal luncheon of the members at the Cosmos Club. Dr. Emerson convincingly demonstrated the importance of analogy in determining the development of language, showing especially how singular forms had displaced original plurals in the history of Old and Middle English inflections. Professor A. R. Morris then pointed out the rhythmic elements in modern so-called free verse, and Professor F. N. Scott discussed the chief differences between British and American idiom, showing that (1) in the field of modern slang each was more or less independent of the other, with vapidity as the general characteristic of the former, and explosive emotionalism as that of the latter; that (2) in the common everyday vocabulary the differences consisted only in a few hundred words; and that (3) in the field of literary expression the two idioms were practically identical. The Saturday morning session, Dr. E. Sapir in the chair, consisted of scholarly papers by Drs. Truman Michelson and E. Sapir upon questions of Amerindian philology; a summary of the contents of the Kashmerian Atharva Veda, by Professor LeRoy C. Barret; and a discussion of Dostoyevsky and Scythism, by Professor Clarence A. Manning.

### *The History of Science Society*

*President,* L. J. Henderson.

*Secretary,* Frederick E. Brasch, Smithsonian Division, Library of Congress, Washington, D. C.

(*Report by Frederick E. Brasch*)

The first annual meeting of the newly organized History of Science Society was held, together with the fourth annual meeting of Section L of the A. A. A. S., on Wednesday and Thursday, December 31, and January 1. The program committee attempted to present history in a comprehensive and genetic order, with the thought that the concepts of history are to be derived from the study of paleontology. In very clear and concise statements Dr. John C. Merriam, president of the Carnegie Institution of Washington, and one of America's great authorities in the science of paleontology, presented a study of the development of present-day conception of paleontological history. He pointed out the fundamental importance of the records of paleontology as basis for study of human history and its correlation to the study of the history of science.

Following the past order of experience of program procedure, the committee also formulated a definite and fixed idea in having a connected series of papers or addresses upon some particular phase of history of scientific thought. In the following papers the development of scientific thought, through from the early Middle Ages to the end of the Fifteenth Century, was presented by a number of America's best scholars of medieval history. In this remarkable series of addresses it was clearly evident to the student of the history of science that this field of research is rich in material for future study. Dr. Charles H. Haskins, of Harvard University, emphasized the status of Arabic science in Christian Europe, and that the Arabs were worthy contributors during the eleventh and twelfth centuries. Dr. George Sarton, Research Associate of the Carnegie Institution of Washington, also pointed out the importance of the study of medieval science, and its contributing factor to the modern period. He also emphasized the connecting bond between Arabic science and the period immediately following, namely,

the Middle Ages. The natural sciences in the University of Paris during the Middle Ages gave an interesting revelation of the struggle between the more advanced students and the adherents of Aristotle's physics. Dr. L. J. Paetow, of the University of California, discussed this phase. Nature was to be revealed from the written records and books and not by empirical methods, consequently science slept in the background of credulity. The last paper of this series was given by Dr. Lynn Thorndike, of Columbia University. The "Study of western science of the fourteenth and fifteenth century" is contained in manuscript records that manifestly form for the future historian of science labor for years to come. Dr. Thorndike listed many of the more important books and manuscripts and especially recommended these as sources for new researches.

Dr. R. C. Archibald, of Brown University, presented an interesting account of Benjamin Peirce, who for over fifty years taught mathematics at Harvard University. This beautiful remembrance of Dr. Archibald's old tutor is to be published in one of the journals of the American Mathematical Society. Dr. C. E. Tharaldsen, of Northwestern University, gave a life sketch of Dr. William A. Locy, who died October 9, 1924. As a pioneer, Dr. Locy's spirit will be remembered throughout the history of science in America.

Dr. C. A. Browne, chief chemist of the United States Bureau of Chemistry, presented a paper entitled "Scientific notes from the books and letters of John Winthrop, Jr. (1606–1676), first governor of Connecticut."

The address of the retiring chairman and vice-president of Section L entitled "Leibnitz, the master builder of mathematical notations," was given at the second session by Dr. Florian Cajori, of the University of California. It was pointed out that, unlike Descartes and Newton, Leibnitz gave prolonged and persistent attention to mathematical notations. At different times he tested four different symbols for equality, three for proportion, three for coincidence of geometric figures, two for similarity, four for congruence, five for multiplication, three for division and about half a dozen for aggregation of terms. As a result of this painstaking experimental method, Leibnitz finally advanced more mathematical symbols that have retained their place to the present time than has any other mathematician. Preeminent is his symbolism for the differential and integral calculus.

The business meeting of the History of Science Society was held on the evening of December 31, at the Cosmos Club. At this time the council of the new society elected the following officers for the year (1925): *President,* L. J. Henderson; *vice-presidents,* J. H. Breasted and Florian Cajori; *secretary,* L. Leland Locke, and *treasurer and assistant secretary,* Frederick E. Brasch. Also five council members were reelected, namely, Isaiah Bowman, E. W. Brown, Henry Crew, David Starr Jordan and George Ellery Hale.

### SECTION M (ENGINEERING)

*Vice-president and chairman,* A. E. Kennelly.

*Retiring vice-president,* John T. Faig.

*Secretary,* Hugh Miller, 2023 G Street, N. W., Washington, D. C.

(*Report by Hugh Miller*)

There were two meetings of Section M, on the evenings of Tuesday and Wednesday, December 30th and 31st. Owing to inclement weather the attendance was not as large as expected, but there were about 50 at each meeting, and there was a lively interest in the papers presented and considerable discussion. Dr. Kennelly was unable to be present at the first meeting and Dr. William Bowie presided. The paper by Mr. Alfred D. Flinn, director of the Engineering Foundation, absorbed the interest of all those present and aroused considerable discussion regarding engineering research. The second meeting was featured by papers by Major General William M. Black, retired, formerly chief of engineers, U. S. A., and Hon. Robert B. Howell, senator from Nebraska. Senator Howell's paper on the "Engineer and legislation" provoked the most discussion, as he discussed at some length the economic conditions surrounding agriculture and their relation to the welfare of the country as a whole. He stated that the engineering type of mind was necessary to a satisfactory solution of the problem, and it was encouraging to see how many of the engineers present were vitally interested in this fundamental economic problem. Senator Howell pointed out that the direct influence of the engineer upon legislation has been very slight in the past and referred to the fact that he had been able to find only two engineers who had been members of the U. S. Senate previous to his election, and both of these had given up the practice of engineering some years before their election. On the other hand, there has always been a large majority of lawyers, and the number of business men in the Senate has been steadily increasing in recent years. The number of lawyers has decreased somewhat, but the combined percentage of practicing lawyers and business men has remained almost constant over a period of 100 years, amounting to practically 74 per cent. of the membership. Several speakers mentioned the great help that engineers have been to agriculture and ways in which they could be more

useful in the future. The points mentioned were transportation by rail and water, improved farm machinery, power and other conveniences on the farm, irrigation and the development of commercial fertilizer on a large scale. Among those who took part in the discussion were: Brigadier General William H. Bixby, another former chief of engineers, U. S. A.; Colonel E. Lester Jones, director of the U. S. Coast and Geodetic Survey; Professor H. S. Moore, of the University of Illinois, and Dr. William Bowie, of the U. S. Coast and Geodetic Survey.

The section unanimously passed the following resolution: "Resolved, that Section M of the A. A. A. S. heartily supports the movement to establish a National Museum of Engineering and Industry in Washington, and recommends to the council of the association its endorsement of the project." The resolution was presented to the council at its meeting on January 2nd and was referred to the executive committee.

At a previous meeting of the council a committee was appointed to consider the question of recommending for the annual meeting next year a series of short addresses by representatives of the fundamental sciences before the Engineering Section. It is hoped that this plan may be carried out, as it should be of great interest and would tend to make a definite field of usefulness for the Engineering Section.

### SECTION N (MEDICAL SCIENCES)

*Vice-president and chairman,* William A. MacCallum.

*Retiring vice-president,* Richard P. Strong.

*Secretary,* A. J. Goldfarb, College of the City of New York, New York, N. Y.

(*Report by A. J. Goldfarb*)

The Washington meeting was unusually significant for the outstanding character of the joint meetings, and for the large number, high standard and wide extent of the papers in the individual societies affiliated with Section N. The meeting began with a joint meeting of Section N with the Physiological, Biochemical, Pharmacological and Pathological Societies, the first one in many years. There were four invited speakers. Each had time to give, and did give, a clear, adequate, rounded account of significant researches. Many independent reports attest to the increasing value of such fuller discussion of important and widely different problems. The relationship of the ductless glands to one another was carefully discussed by Dr. Marine; Dr. Lusk discussed in his fine and dramatic way the source of energy in muscular activity; the trail-blazing exposition of the chemistry and physics of circulation was given by Dr. Henderson; a clear and convincing parallelism between light, temperature and other climatic factors with the corresponding cyclical change in syphilis and cancer was given by Dr. Wade Brown. As in the last two years, there was a second meeting devoted to discussion by representatives from the fields of medical research, parasitology and medical entomology. This year anthropologists also cooperated, and the American Society of Bacteriologists likewise met with the section. Even the large room put at our disposal was totally inadequate. Dr. Strong's retiring vice-presidential address bespoke the aims of the section. In the investigation of a plant disease he was led not only into the fields of plant pathology, but of protozoology, parasitology of reptiles and of man. A single organism passes through all these hosts, and is curiously different morphologically and physiologically in each case. To understand its etiology and the adaptive changes of the organism it was necessary to study in each of these related fields.

Dr. Draper's paper showed the necessity of an understanding of anthropometry in disease. Dr. Hess closely correlated his studies on the results of irradiation of plants and of oils, which contained no vitamins, with the healing effects produced on animals fed with such irradiated foods. The implication to human needs was evident. Most significant of all, he traced the results to the action of a definite chemical substance in the skin. Dr. Cort's fine presentation of new and absorbingly interesting factors in the spread of hookworms was based upon his recent studies in China. Dr. Francis, of the Bacteriological Society, gave a dramatic and most interesting account of a bacterial parasite of rodents and a corresponding bacterial disease in man, both of which were finally shown to be the same organism. With this knowledge, this increasingly widespread disease may now be controlled.

There was a good deal of overcrowding at the medical science sessions and the facilities were not quite adequate. There were petty annoyances. But the meetings were nevertheless of an unusually high character, bringing together workers in allied fields in larger numbers than ever before in the history of the association. The outstanding achievement is clearly the bringing together of so great a number of workers from so large an area, including the most eminent investigators in their respective fields, to stimulate all to the highest standards, and, above all else, to discuss interrelated scientific problems.

### THE FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY

*Chairman,* A. S. Warthin.

*Secretary,* E. B. Krumbhaar, Philadelphia General Hospital, Philadelphia, Pa.

(The Federation is composed of four societies, each of which will be reported later.—B. E. L.)

(*Report by E. B. Krumbhaar*)

The following notes summarize a joint session of all four societies held on Wednesday afternoon. Three memorials were read of members who had died during the last year. Dr. William H. Howell spoke of Theodore Hough, who was one of the last pupils of Newell Martin. Dr. W. G. Garrey gave a beautiful tribute to Jacques Loeb, both as a scientist of the very highest order and as a man and a friend. E. K. Marshall spoke of Benjamin S. Neuhausen, a very promising young member of the Biochemical Society, recently deceased, who had worked for two years in his laboratory.

The scientific program of the joint session was opened by Murlin's paper on the administration of insulin by the alimentary tract, wherein he showed various ways by which this might be done efficiently. The causes of gastric secretion were studied by Ivy and others from the University of Chicago. They found not only that intestinal juice, through a Thery fistula, would stimulate acid secretion, but that an inflated bag would also do this by distention and by increasing gastric motility. Dr. Cannon, in his study of a pseudaffective state in cats, called attention to the facts that the bodily changes that accompany extreme emotions are elemental and that many are the same in man and animals. By destroying both frontal lobes and the lateral cortices of cats, whose hearts had been denervated and vascular system attached to pressure recording apparatus, he was able to observe numerous "release phenomena." Struggling, scratching, biting, extension of claws and erection of hair, occurring frequently but not continuously, were associated with increased blood pressure and blood sugar content.

Collip, of Alberta, presented an extremely important preliminary communication on a hormone that he had isolated from the parathyroid gland. He claimed to have the extract of an active principle, as powerful as insulin, which on injection would prevent tetany for 30 hours in parathyroidectomized animals. He had been able to keep one such animal alive for 10 weeks by the use of this extract. He also was able to produce such a rise in blood calcium that vomiting occurred, then weakness, atony, coma and death. The blood became so thick that it would not pour. He found that dogs without both thyroid and parathyroid were more sensitive, which he considered the first definite evidence of antagonism between the thyroid and parathyroid. When this work is extended and verified, it should rank as an extremely important physiological discovery.

Mansfield Clarke, the distinguished exponent of hydrogen ion concentration, and his associates at the Hygienic Laboratory gave an interpretation of the biochemical reduction of methylene blue. No subject is more important in biology to-day than that of oxidation and reduction. We hope his work will be as productive in this field as with the hydrogen ion. The paper by Gesell and his associates on experimental data relating to the chemical regulation of respiration showed that the reaction of the circulating blood is not the factor controlling the stimulation of the respiratory center. These investigators believe that, of greater importance, is the condition within the center itself. Novy's important study of the respiration of cells—such as those of the tubercle bacillus—emphasized the need in biology for studying pure cell preparations rather than tissues or whole animals. For the first time, an accurate respiratory quotient for the tubercle bacillus was given (.836 glycerin; .992 glucose); showing that the tubercle bacillus "needs air as much as an animal does." Hugh Young recounted the efforts made in his institute to obtain a true "therapia sterilisans magna," and the partial successes obtained with mercurochrome and gentian violet. The session was closed by O. G. Garne's demonstration of a new and ingenious method of recording time intervals, and its use in experimental physiology, pharmacology and pathology.

## SECTION O (AGRICULTURE)

*Vice-president and chairman,* L. R. Jones.
*Retiring vice-president,* R. A. Pearson.
*Secretary,* P. E. Brown, Iowa State College, Ames, Iowa.

(*Report by P. E. Brown*)

Section O held a joint session with the geneticists interested in agriculture on Monday morning and on Tuesday afternoon arranged a joint program with the American Society for Horticultural Science. On the latter program the section was represented by Oswald Schreiner, who spoke on "Fertilizer experimentation on truck and orchard soils," and by A. J. Pieters, who gave a paper on "Where forage crops touch horticulture." On Wednesday afternoon the section held a joint session with the American Society of Agronomy, the program consisting of a symposium on "Agricultural conditions in foreign lands." C. V. Piper spoke on "British agriculture," H. L. Schantz on "Native and European agriculture in East Africa," J. G. Lipman on "Agricultural conditions in Germany," H. V. Harlan on "Agriculture of the Punjab and Kashmir in India" and H. H. Bennett on "Agriculture in Central America." Several of the speakers illustrated their addresses with

very fine lantern slides. The program was most interesting and profitable. About eighty were in attendance. On Wednesday evening the annual dinner of Section O and all students of agriculture was held at the Hotel Harrington. The address of the retiring vice-president of the section, Dr. R. A. Pearson, president of the Iowa State College, was read at the dinner. The subject of the address was, "Better adapting our educational and investigational efforts to the agricultural situation." Interesting discussion followed the address and the suggestions made by the speaker were heartily endorsed.

SECTION Q (EDUCATION)

*Vice-president and chairman,* L. A. Pechstein.

*Retiring vice-president,* Henry W. Holmes.

*Secretary,* A. S. Barr, Department of Education, University of Wisconsin, Madison, Wis.

(*Report by A. S. Barr*)

Eight well-attended sessions of the section were held on Tuesday, Wednesday and Thursday. The attendance was almost treble that of any previous session, mainly made up of technical students of education. One of the most interesting sessions was the one on "Education as a science," led by S. A. Courtis, who spoke on "The construction of measuring instruments." The other speakers were E. L. Thorndike and Charles H. Judd. Courtis traced the history of the scientific method and discussed some of its applications to education. Thorndike spoke on "The nature of intellect," and discussed the progress so far made in measuring intelligence, with a consideration of the relation between information and judgments; he showed the close relationship existing between the two. Dr. Judd spoke on "Experimental work in school procedure" and reviewed a number of the laboratory studies relating to the study of school subjects and developed somewhat in detail the laboratory technique through the use of the study of reading as an example. (These papers will be published in *School and Society.*) Another very interesting session was the Tuesday morning session, on "Special applications of the scientific method to educational problems." Dr. L. L. Thurstone (University of Chicago) presented the field of "Statistical methods as applied to educational methods," Dr. M. R. Trabue (University of North Carolina) spoke on "The contribution of educational measurements," Dr. Frank N. Freeman (University of Chicago) discussed the "Psychology of school subjects," Dr. S. A. Courtis (University of Michigan) dealt with "The experimental study of instructional problems," and Dr. Wm. A. McCall (Columbia University) discussed "Mental measurement."

One session dealt with "Scientific research with the pre-school child." "Experimental education and the nursery school," "The validity of standards of measurement in young children," "Study of emotions of pre-school children" and "Studies of the relation of mental and physical development" were reported upon. Students of education were impressed with the tremendous amount of learning that goes on prior to the school period. Another session was given over to "Character education" as a scientific problem. Dr. E. S. Starbuck (University of Iowa) spoke on "Research methods in character education," Sister Mary McGrath (St. Mary's College, Monroe, Michigan) discussed "Research findings in the moral development of children," Dr. Wm. Clark Trow (University of Cincinnati) spoke on "Character traits," Dr. George A. Coe (Columbia University) dealt with "Problematic factors in the concept of moral education," and Mr. Milton Fairchild spoke on "Methods of human research." A session was devoted to "Public school administration" and "Problems of financing public education" were discussed by Dr. George D. Strayer; "Scientific procedures in school accounting," by Dr. John Guy Fowlkes, University of Wisconsin, and some "Unsolved problems in school administration," by Dr. J. Cayce Morrison, Ohio State University. Two sessions of eight papers each were given over to the discussion of "Experimental education."

THE SOCIETY OF SIGMA XI

*President,* F. K. Richtmyer.

*Secretary,* Edward Ellery, Union College, Schenectady, N. Y.

(*Report by Edward Ellery*)

The twenty-fifth convention of Sigma Xi was held on Tuesday, December 30. It comprised a business session in the afternoon, a dinner in the early evening and a general session held jointly with the American Association in the evening. At the afternoon session Professor F. K. Richtmyer, president of the national organization, presided. Delegates were present from twenty-four chapters and three Sigma Xi clubs. President Richtmyer gave a report from the executive committee covering the following items: (1) The committee regards as particularly important the extension of the society to institutions outside of the United States, especially to educational institutions in Canada; (2) a fellowship committee, consisting of three members, is to be appointed, and the sum of $2,000 was allotted to the committee to be expended in the support of research during the academic year 1925–26, as the fellowship committee may decide; (3) the California Institute of Technology chapter will be installed February 5th; (4) the executive com-

mittee is considering requests from eleven institutions for charters. Mr. C. E. Davies, of the alumni committee, gave a report of the dinner of the alumni resident in New York and vicinity given November 17th, at which over two hundred were present. Dean Ellery reported from the secretary's office that the work of the office had reached a stage which demanded that the society should engage a full-time paid secretary. He also recommended that action should be taken in the near future appointing one authorized jeweler for the society, and that all insignia should be obtainable only through the official order of the national secretary. There was full and free discussion regarding the recommendations of the president and secretary, and the consensus of opinion was in harmony with the ideas of the executive committee regarding the future of the society. The treasurer's report was given by Dean George B. Pegram, of Columbia University. It showed that the fellowship fund contains to date practically $3,000 and that there is a small balance remaining over the expenses of the society for the past year. Dean Pegram further reported that during the year, for the first time in its history, the society had budgetted its expenses, and a budget for the coming year had been prepared and accepted by the executive committee.

At the dinner held in the cafeteria of the Interior Department Building, short speeches were made by Dr. Frederick F. Russell and Senator Joseph E. Ransdell, of Louisiana. Dr. Russell gave expression to his interest in Sigma Xi ideals and in the organization of the society for a larger work in the promotion of research. Senator Ransdell spoke of the great work done by science in eradicating epidemic diseases of man and animals in the south. The evening session was held jointly with the American Association, being the third general session at Washington, with Dr. Frederick F. Russell as the speaker. It has been reported under general sessions.

THE AMERICAN ASSOCIATION OF UNIVERSITY PROFESSORS

*President,* A. O. Leuschner.

*Secretary,* H. W. Tyler, Massachusetts Institute of Technology, Cambridge, Mass.

(*Report by H. W. Tyler*)

The annual meeting was held at the building of the National Academy of Sciences on Saturday and Monday, December 27th and 29th. Reports were presented by the committees on academic freedom and tenure; on the status of women in college and university faculties; also an informal statement by the chairman of the committee on college athletics. A group of sub-committee reports dealt with extra collegiate intellectual service; general reading for undergraduates; preceptorial and tutorial systems. Brief reports were also made by the committees on systems of sabbatical years; cooperation with Latin-American universities to promote exchange of professors, trips and fellowships; freedom of teaching in science.

In connection with the report on academic freedom and tenure, resolutions were adopted supplementing the report of a recent investigation at the University of Tennessee. These resolutions state: (1) That the complications which led to the dismissals could have been easily composed by a wise administration; (2) that none of the dismissals were justified; (3) that the rights for an impartial hearing of those dismissed were violated; (4) that conditions such as have been disclosed in the University of Tennessee are detrimental to the purposes of the institution and to the interests of higher education in general; (5) that the discussion of educational policies and proposals for the betterment of the institution, which discussion has been objected to by the administration, is the duty of every faculty member; (6) that the seeking of the counsel, on the part of faculty members, from the officers of the American Association of University Professors should have been welcomed and not resented by the administration of the University of Tennessee.

A resolution was adopted bearing on the question of civilian instruction at Annapolis and West Point, the sense of which is as follows: The efficiency of instruction in general academic subjects at the U. S. military and naval academies depends upon the employment of skilled teachers. Such teachers are, as a rule, likely to be recruited and retained only if good conditions of appointment, promotion and security of tenure during good service are maintained, and it is urged that means toward the maintenance of these conditions be continued and strengthened and clarified where necessary.

It was voted that the association recommends to the U. S. Commissioner of Education that in plans for future Education Weeks topics of controversial character should be avoided. It was voted that the association record its judgment that the conferring of honorary Ph.D. degrees is contrary to sound educational policy as now generally recognized.

THE GAMMA ALPHA GRADUATE SCIENTIFIC FRATERNITY

*President,* E. M. Gilbert.

*Secretary,* Lee M. Hutchins, Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C.

(*Report by Lee M. Hutchins*)

The annual council meeting, convention and banquet of the fraternity were held at the Raleigh Hotel

on Thursday, January 1st. These meetings celebrated the quarter-century anniversary of the founding of the fraternity, the eighteenth anniversary of its first national convention and the fourth anniversary of its affiliation with the American Association for the Advancement of Science. One hundred and fifty active and alumni members registered at the Gamma Alpha booth in the registration room at the New Willard Hotel, all the chapters being represented. The council meeting and the convention were presided over by President Gilbert, and Dr. J. Brian Eby, of Washington, was toastmaster at the banquet.

A charter was presented to the Washington Alumni Gamma Alphans, which organized the sixteenth chapter of the fraternity, to be known as the Washington Alumni Chapter.

The national officers of the fraternity for 1925 are: *President,* A. H. Wright (Cornell University); *vice-president and secretary,* J. E. Ackert (Manhattan, Kansas); *treasurer,* W. B. Burnett (Mellon Institute); *recorder,* C. C. Murdock (Cornell University); *editor,* nomination assigned to the Illinois chapter; *representatives in the council of the American Association for the Advancement of Science,* H. L. Rietz (University of Iowa) and Alvah Peterson (Rutgers College). The 1925 council meeting and convention of Gamma Alpha will be held in Kansas City, contemporaneous with the meetings of the American Association for the Advancement of Science.

### THE SIGMA DELTA EPSILON GRADUATE WOMEN'S SCIENTIFIC FRATERNITY

*President,* Adele L. Grant.

*Secretary,* Evelyn I. Fernald, Rockford College, Rockford, Ill.

(*Report by Evelyn I. Fernald*)

Two new chapters were announced: Gamma, at the University of Illinois, and Delta, at the University of Missouri. The national officers elected for the coming year are as follows: *President,* Eloise Gerry (University of Wisconsin); *first vice-president,* Adelaide Spohn (Cornell University); *second vice-president,* Mary G. Haseman (University of Illinois); *secretary,* Edna M. Feltges (University of Wisconsin); *treasurer,* Grace H. Griswold (Cornell University).

Wednesday morning, after the breakfast held for all women interested in science, Mrs. Charles D. Walcott, of Washington, D. C., gave a very interesting and finely illustrated account of her expeditions in the western mountains. She showed a large number of wonderfully beautiful paintings and photographs. Forty-nine women were present.

## THE WASHINGTON EXHIBITIONS

(*By Charles A. Shull, Manager of the Exhibition*)

The exhibition held in connection with the fifth Washington meeting of the American Association for the Advancement of Science and Associated Societies was by far the largest and finest in the history of the association, and was in every way a worthy accompaniment to the largest meeting of scientists in the history of the world. Under the skilful direction of the chairman of the local committee on exhibits, Mr. W. J. Showalter, of the National Geographic Society, whose efficient and genial service to the association and to the exhibitors is deeply appreciated, the arrangements were carried out in such a way as to make the general exhibition almost ideal from the standpoint of a scientific and educational as well as from that of a commercial enterprise.

Local conditions made it impossible to stage the entire exhibition in a single locality, and many different buildings held exhibits of great interest to visiting scientists. The main exhibition was placed in the Gymnasium Building of George Washington University; but exhibits were also to be found in the corridors of Central High School and at the Hygienic Laboratory, the Carnegie Institution Building, the New National Museum, the National Geographic Society headquarters, the National Academy of Sciences Building, the U. S. Department of Agriculture, the U. S. Weather Bureau, the Bureau of Standards and the Naval Observatory. The American Association for the Advancement of Science is very grateful to these institutions for their cordial cooperation, particularly to the George Washington University for the use of its gymnasium. It extends its thanks to those who made it possible to use the building for exhibition purposes and to all cooperating institutions.

The exhibits themselves may be grouped according to their locations, as in the following summary:

### EXHIBITS MAINLY IN THE GENERAL EXHIBITION

*The Bausch and Lomb Optical Co., The Spencer Lens Co.* and *The Scientific Cinema and Supply Co.* furnished projection apparatus and screens for the lecture rooms. In this very fine service to the association and the scientists they were joined by the *Trans-Lux Daylight Picture Screen Co.,* of New York City, who not only exhibited their opaque projector in the general exhibition, but also provided daylight screens for many of the lecture rooms where lanterns were required. This splendid service on the part of these four companies went far toward making the presentation of data more successful than ever before, and was an important contribution to the meeting as

a whole. On behalf of all the many societies benefited by the service, the association expresses to these firms its hearty thanks.

The displays of optical instruments and other instruments of precision were unusually fine in this exhibition. Special mention is to be made of the great courtesy shown by *The E. Leitz Co.*, of New York City, and the *Bausch and Lomb Optical Co.*, of Rochester, N. Y., who furnished unusually fine microscope equipment for individual investigators exhibiting cytological material. This special service by these two firms is deeply appreciated by the association and by the individual investigators who were thus favored.

*The E. Leitz Co.* had on exhibition a magnificent array of instruments, including biological and petrographic microscopes, binoculars, stereomagnifiers, photomicrographic apparatus, camera attachments, lamps and Edinger drawing and projection apparatus. *The Bausch and Lomb Optical Co.*, in addition to loaning many lanterns for use in the session rooms, exhibited microscopes, projection apparatus and photomicrographic equipment. *The Spencer Lens Co.*, of Buffalo, N. Y., exhibited microtomes, microscopes and other optical instruments, such as cameras, spectroscopes, delineascopes, lamps, etc. *The Palo Co.*, of New York City, showed beautiful models of Busch microscopes, binocular telescopes, photographic cameras and the Ives tint photometer. They also had specimens of the Meker furnaces on display. *The R. Y. Ferner Co.*, Washington, D. C., representatives of the *Société Genevoise*, made a specialty of their Kremp microscopes, and a new mechanical microscope stage with uniaxial control. *The Leeds and Northrup Co.*, Philadelphia, showed examples of their precision apparatus, high sensitivity galvanometers and potentiometers, a thermostat with precision of 0.005° C. and a light recorder in operation. This recorder, by means of a photoelectric cell, measures the total light intensity and records it on a revolving drum automatically. This instrument should be valuable in measuring the light values of plant and animal habitats. *The Cambridge Instrument Co.*, of Ossining-on-Hudson, N. Y., showed many instruments of precision, voltmeters and flux meters, vernier and slide potentiometers, the Callandar-Griffiths model measuring-microscope, extensometers and stress recorders, electrometers, alpha-ray-track apparatus, a new Universal microtome, string galvanometers and recording clinical thermometer. *James G. Biddle*, Philadelphia, had on display rheostats, tachometers and other speed indicators, meg-ohmmeter, precision ammeters and voltmeters, a new model A potentiometer, dial pattern resistance boxes and Wheatstone bridges, "Point-o-Lite" lamps, meg-insulation testers and a new pattern of Langmuir pump. *The Keuffel and Esser Co.*, of Hoboken, N. J., showed a direct reading spectrophotometer, or color analyzer, and cases of slide rules, drawing instruments in all stages of the manufacturing process, chronometers and surveying instruments.

The importance of the chemical industries in promoting research was evidenced by a number of excellent displays of chemicals. *The Eastman Kodak Co.*, Rochester, N. Y., displayed a group of their organic chemicals, and in addition had in operation the Cine Kodak and Kodascope, suitable for the display of motion pictures in the home, a group of colored films and the well-known Wrattan gelatin light filters, of mono- and ortho-chromatic series. *The Mallinckrodt Chemical Co.*, of St. Louis, showed a selection of their fine line of chemicals, particularly a new analytical grade of high purity. *Coleman and Bell*, of Norwood, Ohio, exhibited their laboratory reagents, both inorganic and organic, particularly their excellent biological stains, solutions, chemical indicators and test papers. *The LaMotte Chemical Products Co.*, of Baltimore, made a specialty of hydrogen-ion-determination facilities. The new LaMotte Hydrogen-ion Testing Set was on display, along with their color standards. *The National Aniline and Chemical Co.*, of New York City, displayed biological dyes, stains, indicators and other reagents for laboratory purposes. *The Graham Chemical Co.*, of Washington, D. C., showed methods and apparatus and buffer and indicator chemicals for hydrogen-ion determination, and had hydrogen-ion and oxidation-reduction electrodes in operation.

Chemical resistant wares were represented by an unusually fine display of "vitreosil" ware (fused silica) by the *Thermal Syndicate, Ltd.*, of Brooklyn, N. Y. Beakers, evaporating dishes, crucibles, etc., made of this very insoluble material, and a vitreosil still suitable for the preparation of conductivity water were on their tables. Some very fine specimens of optical fused quartz were shown. *The R. P. Cargille Co.*, of New York City, had their "Impervite" porcelain on display, and handed out samples to those interested. They also showed a micrometer for measuring the inside diameter of tubes and a fine sample of colloidal gold sol made by the Bredig process.

Two society groups merged their exhibitions with the general exhibition, and a number of firms responded to requests for special exhibits of interest to these societies. Thus the *Mathematical Section of the Association and its affiliated societies* arranged a special exhibition for mathematicians, including in it the various publications of the societies. Several computing machine companies contributed to this society exhibition. *The Monroe Calculating Machine Co.*, the *Ralph C. Coxhead Corp.* and the *Millionaire Computing Machine Co.*, all of New York City, were located

close together, so that comparisons could be readily made. The *Coxhead Corp.* handle the Mercedes-Euklid machine, and they had three types on exhibit, the hand machine, the semiautomatic electric and the new fully automatic electric. *The International Business Machines Corp.*, of Washington, D. C., also showed an electric accounting machine and an electric sorting machine.

Through the courtesy of Major General Taylor, chief of the Engineering Corps of the U. S. Army; Major General Mason M. Patrick, chief of the Air Service, U. S. Army, and Dr. E. Lester Jones, director of the U. S. Coast and Geodetic Survey, these organizations contributed to the exhibition for the mathematical societies and to the rest of the general exhibition. *The Engineering Corps* exhibited models of locks and dams and weirs used in controlling inland waterways, also the development of sea-coast harbors. The *Army Air Service* showed mapping cameras, aerial maps and the general aerial activities of the service. There were also some fine topographic representations of relief. *The Coast and Geodetic Survey* showed the theodolite, zenith telescope, Ferrell Tide-predicting machine, automatic tide gauge, radio longitude apparatus and a model of a triangulation tower. These exhibits added much to the interest of mathematicians in the entire exhibition.

*The Association of Official Seed Analysts* had also collaborated with several firms in securing apparatus of interest to their members. *The District of Columbia Paper Manufacturing Co.* displayed paper, driers for herbarium specimens, seed-germination blotters, etc., and the *Heywood Manufacturing Co.*, of Minneapolis, sent samples of jute and kraft envelopes, suitable for seed handling. *The Porter Safety Seal Co.*, of Chicago, sent one of their sealing machines, with seals for sealing bags of seeds. *The W. S. Tyler Co.*, of Cleveland, exhibited the "Ro-Tap" testing sieve shaker, and many varieties of screens suitable for sorting seeds.

Publishers of books were well represented. The following firms displayed fine assortments of their publications: the Williams and Wilkins Co., of Baltimore; E. P. Dutton and Co., the D. Van Nostrand Co., the Macmillan Co., D. Appleton and Co., John Wiley and Sons and Ginn and Co., all of New York; Lea and Febiger, and P. Blakiston's Son and Co., of Philadelphia; the World Book Co., of Yonkers, N. Y.; the University of Chicago Press, of Chicago; the Yale University Press, of New Haven, and the University of California Press, of Berkeley. The G. E. Stechert Co., of New York, exhibited an extensive line of imported German publications. The Grolier Society, of New York, exhibited for the first time their new 15 volume work, the "Book of Popular Science," with 5,000 illustrations, and 20,000 index references. Many of the illustrations decorated the walls of their booth. In addition to the above companies, the National Geographic Society, the National Research Council and Science Service showed their publications in the interests of the advancement of science, and Edwards Brothers, Ann Arbor, had a number of very well-made mimeographed text-books on display. Several companies exhibited lithographic art, notably Gatchel and Manning, of Philadelphia, and the Heliotype Co., of Boston. Mrs. Charles D. Walcott, Washington, D. C., showed sample color-process plates of her paintings of wild flowers, in process of publication. These plates are being made by the Beck Engraving Co., of Philadelphia.

*The General Biological Supply House* showed a fine display of mounted specimens, life-history series, injected specimens, wax models of chick embryos, fertilization and maturation in Ascaris, Jewell models of stem and leaf structure, skulls and skeletons, brain of shark and many other supplies for biological laboratories and students.

A few miscellaneous exhibits should be mentioned. *The Purox Co.*, of Denver, showed the "Purox" all-metal container for storage and transportation of liquid oxygen and other liquefied gases. *The Sterling Watch Co.*, of New York, had the Pastor stop watch on exhibition and sale. *The Eastern Instrument Co.*, of Newark, N. J., exhibited an ingenious air tester by means of which it can easily be determined whether a room is too dry for comfortable living. *Forbes and Myers*, of Worcester, Mass., had on display their "Seventy Six" tool grinder, with the unassembled parts to show how it is constructed. *The W. M. Welch Co.*, of Chicago, showed a chart illustrating the periodic arrangement of the atoms, and *C. Francis Jenkins*, of Washington, D. C., had a most interesting radio-picture transmitter and receiver in operation.

*The Metric Association* occupied a booth in the general exhibition room and exhibited standard metric units, scales on which one could weigh himself in kilos, and literature explaining the aims of the association and the many merits of the metric system of weights and measures.

Several government bureaus, besides the government services already mentioned, contributed to the success of the general exhibition by placing some of their apparatus and exhibits of their special activities on display. The U. S. Weather Bureau contributed meteorological instruments, barographs, hydrographs, etc. The U. S. Bureau of Standards exhibited standard samples, standardized weights, optical glass, an interferometer, etc. The U. S. Forest Service showed forest products, methods of forest protection, range finders, calipers and specimens

showing the influence of turpentining on the growth of pine trees.

The exhibits of several individual exhibitors placed in the general exhibition will be mentioned in the list of individual exhibitors, below.

To all the exhibitors—firms, individuals and organizations—who contributed to the splendid success of the general exhibition, the American Association for the Advancement of Science expresses its appreciation and extends its cordial thanks.

### EXHIBITS MAINLY AT THE CENTRAL HIGH SCHOOL BUILDING

*The Entomological Society of America,* and *the American Association of Economic Entomologists* placed an extensive series of collections, life histories, insect injuries to products, insecticides, dusting and spraying apparatus, etc., in the Armory Annex at the Central High School Building. Many of the items were contributed by individuals. Besides these there were numerous exhibits by individual scientists, as follows:

*A. Brozek,* Prague, Czechoslovakia: Seventy slides showing genetics in Mimulus.

*Lee M. Hutchins,* U. S. Department of Agriculture and the Johns Hopkins University, Laboratory of Plant Physiology: Apparatus for determining the oxygen-supplying power of the soil or other plant or animal environment.

*R. B. Harvey,* University of Minnesota: New method for blanching celery with ethylene, also Yellowstone National Park views, in interest of a proposed Biological Station in the Park.

*Ralph E. Cleland,* Goucher College: Chromosomes of Oenotheras.

*Charles E. Allen,* University of Wisconsin: Chromosomes of Sphaerocarpos.

*A. M. Showalter,* University of Wisconsin: Antherozoids and fertilization in Riccardia.

*W. R. Taylor,* University of Pennsylvania: Chromosomes of Gasteria and Allium, with satellites.

*F. B. Wann,* Cornell University: Pure cultures of Chlorella, Ulothrix, Scenedesmus, liverworts, mosses, ferns and Lemna, on mineral nutrient agar.

*F. E. Lloyd,* McGill University: Transparencies showing sexual reproduction in Spirogyra and color-process photographs of fluorescence of chlorophyll.

*F. M. Shertz,* U. S. Department of Agriculture: Chloroplast pigments, alkali and acid derivatives of chlorophyll, copper and zinc derivatives of chlorophyll, and commercial preparations.

*H. J. Muller,* University of Texas: Moving model of mitosis and segregation.

*C. L. Turner,* Beloit College: Aberrant secondary sexual characters in crayfishes.

*H. V. Neal,* Tufts College: Germ glands of a gynandromorph frog.

*B. H. Grave,* Crawfordsville, Ind.: Rate of growth of sessile animals.

*W. W. Swingle,* Yale University: Sex differentiation in Rana Catesbeiana.

*Ruth Jane Ball,* University of Vermont: New parasites of Bermuda Echinoidea.

*L. C. Dunn,* Connecticut Agricultural College: Bones of rumpless and normal fowls.

*H. S. Jurica,* St. Procopius College: Charts of plant structures.

*Charles T. Knipp,* University of Illinois: A simple alpha-ray-track apparatus, which could be operated by the visitor.

*Alfred C. Hawkins,* University of Rochester: Set of forty oils of known refractive index, suitable for microscopic use.

*J. H. Gerould,* Dartmouth College: Physiology of coloration in butterflies of the genus Colias.

*H. M. Wetherill,* Phoenixville, Pa.: Printing by typen, a device for conveniently lettering labels, etc.

These individual exhibits, mainly in the corridors of the Central High School Building, attracted great attention and the benefit they brought to the advancement of science is incalculable. The personal effort and sacrifice involved in bringing these fine things together were undoubtedly very great, but it was surely worth while in a very deep sense. It is hoped that individual exhibits may assume a still greater prominence at future annual meetings of the association. The loyalty and generosity of these exhibitors is worthy of praise, and we hope that they will feel repaid by the appreciation of those who saw and admired their work and by the knowledge that they helped greatly toward real progress.

### EXHIBITS IN OTHER PLACES

Those who visited the many laboratories and rooms of the U. S. Department of Agriculture, the U. S. Bureau of Standards, the U. S. Naval Observatory and the National Academy of Sciences Building found many special exhibits that had been prepared for the visiting scientists. They can not be described here. Special mention should be made, however, of a very comprehensive exhibition of its recent research activities made available during the meeting by the Carnegie Institution of Washington. This exhibition was installed in the administration building of the institution. It was as interesting and otherwise as valuable in many ways as was any other feature of the Washington exhibitions.

The manager of the exhibition wishes to express his sincere thanks to those who cooperated so cordially to make a success of the exhibition, particularly to the local subcommittee on exhibitions and to the firms,

organizations, institutions and individuals who responded so generously to his invitations to participate. Without such friendly cooperation nothing worth while could have been done. The final result exceeded anything that had been anticipated, and gives reason to hope that the annual exhibition of the American Association for the Advancement of Science and Associated Societies will grow in importance and value with the years.

## THE ORGANIZATION, WORK AND PURPOSES OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

### GENERAL SCOPE

The American Association for the Advancement of Science aims to advance science in the New World in every feasible way. The majority of its members and all the societies now associated with it are of the United States or Canada, but its field is not limited to those two countries and it has members residing in all parts of the world. All who are interested in the progress of knowledge and education are eligible to membership. Its organization presents two aspects:

(1) It constitutes a cooperation of many thousands of individuals for the advancement of science and all that this phrase implies. At the opening of the Washington meeting the membership list included 13,633 names. Its membership represents persons engaged in scientific or educational work or appreciating the value of these lines of activity. The individual members of the association support its project through financial contributions, which may have the form of *sustaining-membership* contributions, *life-membership* contributions, *annual membership* dues, or *associateship* dues. Contributions of the last two forms are used directly to support the work of the association, while only the income from the first two forms of contribution is thus used, these contributions themselves being permanently invested and very carefully guarded.

(2) The association is also a great general organization of eighty-three wholly autonomous and independent *associated* scientific societies and twelve local academies of science and learning. Forty-nine of the larger associated societies and all the associated academies are officially *affiliated* with the association. Affiliated organizations have representation in the association council and in its section committees, thereby taking part in the control of its affairs. Whether affiliated or not, the associated societies have no responsibility for the financial support of the organization, which is borne, as has been said above, solely by the individual members. A list of the associated societies is presented farther on in this issue of SCIENCE.

The association aims to assist, in every feasible way, the work of all men and women of science and that of all scientific and educational organizations, especially those that are associated with it. A large number of the latter regularly meet at the times and places of the association meetings, while many others frequently do so. The facilities of the association, for arranging sessions, etc., are at the disposal of all the societies that meet with it at any of its meetings. Reduced railway rates for the meetings are generally secured. To individual members the organization is valuable in many ways, especially through its publications and through the meetings. The permanent secretary's office is always ready to aid the scientific work of members in every way possible. It is hoped that all members and all associated societies may realize that the American Association for the Advancement of Science is *their* association, and that they will continue to demand of its officers more and better work for the growth of knowledge, for increased popular appreciation of science and the scientific method of thought, and for the improvement of democratic civilization in general. It is also hoped that both the societies and the individual members will enter fully into the spirit of cooperation with the section secretaries, with the permanent secretary's office, and with the other officers and committees of the association, to the end that the services of the association may be still further broadened, its prestige may be still further enhanced, and its power may be still further strengthened, "to give a stronger and more general impulse and more systematic direction to scientific research, and to procure for the labors of scientific men increased facilities and a wider usefulness."

### ORGANIZATION

The direction of the association rests in the council, a democratically constituted body that combines the legislative and executive functions. The council consists of the president, the vice-presidents (at present 15 in number), the treasurer, the general secretary, the permanent secretary, the secretaries of the sections (now 15 in number), the council representatives of the affiliated societies and academies (49 societies and 12 academies, with 102 representatives altogether), and eight elected members. All council members, excepting the representatives of societies and academies, are elected by the council itself, for it nominates and elects the president, the general and permanent secretaries, the treasurer and the eight additional elected members, and it elects the vice-presidents and section secretaries on nominations by

the respective sections. There are 144 council memberships at present.

A list of the council members for 1924 has been presented on earlier pages of this issue of SCIENCE. The council meets regularly four or five times during each annual meeting, and interim business is transacted by the executive committee of the council, which consists of the president, the general secretary, the permanent secretary and eight other members elected by the council. The executive committee for 1924 consisted of Simon Flexner, *chairman;* J. McK. Cattell, *president;* D. T. MacDougal, *general secretary;* B. E. Livingston, *permanent secretary;* H. L. Fairchild, L. O. Howard, W. J. Humphreys, G. A. Miller, W. A. Noyes, Herbert Osborn and H. B. Ward. For 1925 the executive committee consists of the following members: M. I. Pupin, W. J. Humphreys, B. E. Livingston, J. McK. Cattell, H. L. Fairchild, W. A. Noyes, H. B. Ward, B. M. Duggar, Vernon Kellogg and Edwin B. Wilson.

The association has fifteen sections, representing the main current subdivisions of science, and each is designated by a letter, as follows: A (Mathematics), B (Physics), C (Chemistry), D (Astronomy), E (Geology and Geography), F (Zoological Sciences), G (Botanical Sciences), H (Anthropology), I (Psychology), K (Social and Economic Sciences), L (Historical and Philological Sciences), M (Engineering), N (Medical Sciences), O (Agriculture), Q (Education). Members of the association may be enrolled in one or more sections and a card file of the members of each section is maintained. Section P is planned for Manufactures and Commerce, but has not yet been organized.

## ACTIVITIES

The activities of the association are, in general, of three kinds, those related to the holding of the annual and other meetings, those related to publications and those related to the advance of knowledge by research. These may be briefly considered in order.

### *Meetings*

The regular annual meetings are made possible by the organization of the association. A local committee for each meeting has charge of all local details. These meetings are the only large gatherings of the kind that include all branches of science. They present to the people an orderly exposition of all the branches of American scientific thought. These, and the other meetings that are occasionally held, constitute a powerful means of disseminating knowledge, of cultivating the scientific attitude of mind and of promoting a general appreciation of the great importance of science and scientific study. For each meeting the association organizes a publicity service, which gives to the daily press authoritative accounts regarding science. The meetings also furnish the only means by which such a large number of active workers in all branches of science are brought together from distant regions, with consequent opportunities for the formation and renewal of numerous personal acquaintanceships and friendships.

When an associated society meets with the others of the group all its needs are cared for through the organization of the association. In these cases the society officers are freed from most of the preliminary work that must always be done in preparing for a society meeting. The association does not urge that associated special scientific societies should always meet with the larger group representing all the sciences; there are good reasons why some societies should generally meet at other times and places, and why some should frequently or occasionally do so. This matter is of course decided by each society for itself. But the association does *invite* all scientific societies to meet with it, especially at the greater four-yearly meetings, and it proffers the machinery of its organization for the advantage of all societies that accept this invitation. It asks the officers of societies that meet elsewhere and at other times to consider seriously how they may be able, nevertheless, to aid their respective section committees to present their respective fields of science in an adequate and impressive way, and it asks the council representatives of the societies to take active part in the work of the association. In a great exposition of American scientific work such as one of the annual meetings of the association, as well as in the conduct of association affairs in general, it is surely desirable that the work of every special scientific society should be well represented. When an associated society does not meet with the rest of the association the corresponding section committee arranges the program for its field of scientific work; in the presence of the societies the section programs are mainly left in their hands.

The council aims to select meeting places in such a way as to bring the meetings successively into the various regions of the United States and Canada, in order that all members may frequently attend without too extensive journeys, and that the wholesome local publicity for scientific work and the general educational influences that always result from the meetings may be brought to all quarters of the two countries.

### *Publications*

The weekly journal SCIENCE, official organ of the association, furnishes an open forum for the discussion of questions regarding science and education. Almost every branch of scientific knowledge is represented in its columns. Many shorter scientific contributions of the results of research are published in SCIENCE, which probably has a larger circulation than any other journal that embraces the entire scientific field.

Since SCIENCE became the official organ of the association for the publication of its official announcements and the reports of its meetings, the annual publication of a volume of proceedings has been discontinued, and volumes of summarized proceedings have been published in their stead. Five volumes of this kind have appeared—the last one in 1921, covering six years. Each of these volumes presents the lists of officers, etc., for each of the years considered, together with references to SCIENCE for the presidential and vice-presidential addresses and other official communications and announcements for those years. It also includes the complete membership list as this stood at the date of printing. It is planned to publish the next volume in the fall of 1925.

The membership list of the association forms one of the most valuable instruments of its kind as an address list of American scientific workers and friends of science. Fellows of the association as well as life and sustaining members are specially designated. The name of every professional scientist ought to be included in this directory, as well as the names of all those who care seriously for any branch of science or for the advancement of science as a whole. The 1925 volume may be secured for $2.00 by members (non-members, $2.50) who make advance payment before the date of publication. After that date the price will be $2.50 to members ($3.25 to non-members).

From time to time the council of the association has adopted resolutions calling attention to various matters that pertain to the general welfare as this is related to scientific thought and setting forth the position taken by the association in these matters. Such resolutions are published in SCIENCE and are sent to interested persons and organizations.

One of the most important features of the work of the association is the support it gives toward the publication of SCIENCE, and one of its main objects is the publication and wide circulation of this weekly journal. SCIENCE is sent free to all members in good standing. Such members are allowed, however, to receive *The Scientific Monthly* instead of SCIENCE, if they so request. At the beginning of the calendar year a subscription to the journal for that year is ordered from the publishers for each member whose annual dues for the current fiscal year have been paid. As a special accommodation, members who paid dues for the preceding fiscal year are kept on the mailing list of the journal until about February 1 (February 6, in 1925), even though they may not have paid for the current year. The journal is then discontinued unless the current dues have been paid. Those paying their dues still later in the year receive the journal from the time the dues are paid, but, as a special favor, may receive the back issues for the current calendar year *if they so request, provided they pay for the transportation of these back issues at the rate of one cent for each copy.*

The association publishes a preliminary announcement for each meeting, which is mailed to all members. It also publishes a general program for each meeting. The general program of an annual meeting forms an excellent epitome of the status of American science at the time. General programs may be secured from the Washington office on request if postage (6 cents) is prepaid. (But the supply of programs of the Fifth Washington Meeting has been exhausted and that program can not be supplied.)

### *Endowment and Grants for Research*

The American association is entrusted with a considerable permanent endowment (now about $133,000), which has been derived from gifts and bequests of public-spirited persons and from payments made by sustaining members and life members. The income derived from these funds is employed to advance scientific research. There is an annual appropriation for grants, which are made to individuals or scientific organizations to aid research projects. Applications for financial assistance in scientific investigations are referred to a special committee on grants which considers the application and apportions the available funds. Recipients of these aids to research make reports to the association, showing how the funds have been expended and the nature of the results obtained.

*It is desirable that the endowment of the association be increased whenever possible,* and it is hoped that the opportunity thus offered for continuously aiding the increase of useful knowledge may be widely appreciated. All who are interested in the advancement of science by research are urged to bring the existence of this trust fund to the attention of public-spirited and philanthropic men who might become donors, sustaining members or life members of the association. The fundamentally democratic nature of the American Association and its broad, general scope constitute an unusual guarantee that funds entrusted to it will be reasonably and efficiently employed in

ways calculated to advance science and improve education.

The association offers the most efficient means by which individuals, scientific societies and scientific institutions may unite to hasten the growth of scientific knowledge and to increase public appreciation of what the peoples and nations owe to science and what may be expected of science in the future. The insistent efforts of many individuals and organizations, united in such a comprehensive association for the advancement of learning, is capable of exerting a most powerful influence for good in national and international development.

*Cooperation with Other Organizations*

Besides the activities mentioned above, the American Association cooperates with other organizations for the advancement of learning. Most of the American scientific societies for special fields of science are affiliated or otherwise associated with the association.

A scientific society may become associated with the American Association on making application to the permanent secretary and upon a vote of the council. No special obligations are involved; but when associated societies meet with the association, the local committee attends to their arrangements, their official programs are published in the general program and their members receive the privilege of reduced railway rates whenever these are secured for the meeting. Their names are shown in the official list of associated societies. Scientific societies are encouraged to become associated with the association.

An associated society may become affiliated with the association upon application to the permanent secretary and upon a vote of the council. Affiliated societies are generally societies for the promotion of scientific research, and they have representation in the council of the association and in its section committees, their representatives being chosen from among the fellows of the association. Members of affiliated societies have the privilege of becoming members of the American Association without payment of the usual entrance fee, if they make application before the second October 1 following their entrance into the society. When a society first becomes affiliated this special privilege is offered to all its members, the offer being open until the second October 1 following the ratification of the arrangements of affiliation. Each affiliated society elects one member of the council of the association, and those societies of which one hundred or more members are fellows of the association elect two council representatives.

Two regional divisions of the association are in very successful operation—the Pacific Division and the Southwestern Division. The former includes all association members residing in Alaska, British Columbia, Washington, Oregon, California, Idaho, Nevada, Utah, Mexico (excepting Sonora and Chihuahua), the Hawaiian and Philippine Islands and other islands of the Pacific. The Southwestern Division includes association members resident in Arizona, New Mexico, Colorado, Sonora, Chihuahua and Texas west of the Pecos River. These divisions are autonomous, holding annual and other meetings and engaging in projects for the advancement of science in their respective regions. Their individual members are members of the association and have all the rights and privileges of this membership. Excepting newly elected members, members of a division pay their annual dues to the Washington office, and the division receives one dollar for each payment thus collected. New members of a division pay the entrance fee and the first annual dues to the division. The division retains the entrance fee and sends five dollars (the first annual dues) to the permanent secretary's office in Washington; upon the receipt of this the new member is enrolled and the journal is ordered for him, and one dollar is transmitted to the division secretary.

Local branches of the association are authorized; and one such branch has thus far been formed, the State College (Pennsylvania) Branch. This branch has two kinds of members—national (regular members of the association residing in or near State College) and associate (individuals who take part in the work of the branch but who are not members of the association). The affairs of the branch are mainly directed by its national members; it is autonomous in its local work.

State academies of science, excepting those representing states lying within the region of either of the two divisions, may become affiliated with the association, there now being twelve affiliated academies. This form of affiliation has been planned to promote the growth of the several academies and especially to aid them in making their meetings increasingly successful and locally influential.

The association cooperates in many ways with its regional divisions and with the affiliated academies to aid in their work of encouraging local interest and appreciation regarding scientific progress.

Many projects for the advancement of science, for the improvement of education and for increased national and international welfare have received the support of the association. Its Committee of One Hundred on Scientific Research, organized early in

1914, formed the beginning of a nation-wide endeavor to accelerate systematic research and to render the knowledge of individuals more readily available to other individuals and to their government and nation. The National Research Council, of the National Academy of Sciences, is now the most prominent national organization for this work in the United States, and the association cooperates with the Research Council in many ways toward the advancement of science and the encouragement of scientific research. The Committee of One Hundred is now being reorganized for new lines of work.

The association has been appreciative of the need for improved facilities for bringing published scientific work to the attention of those who would make use of it—such facilities as abstract journals and other similar aids to research. Financial grants were made to aid the *Concilium Bibliographicum* in its earlier years, and *Botanical Abstracts* was similarly helped at a time when such support was greatly appreciated. Both of these enterprises are now in very promising condition, through assistance secured for them through the National Research Council. For 1923, 1924 and 1925 the association has contributed some financial help to the Annual Tables of Physical, Chemical and Technological Data. For 1925 it is to contribute to the new project of Biological Abstracts, which is being organized under the auspices of the Union of American Biological Societies.

The association cooperates with the U. S. National Academy of Sciences and the U. S. National Research Council in the recently founded Science Service whose aim is to disseminate truthful and at the same time readable information about scientific subjects.

The association is now engaged in a broad survey and study of the place of the sciences in education and it has a special committee on that subject. For the work of this committee financial aid has been provided by the Commonwealth Fund, of New York City. It is hoped that there may result from this study some much needed improvements in education.

It is the aim of the association: To extend its activities in all lines just as rapidly as possible; to make its meetings more efficient and more beneficial; to enlarge the journal and give it a still wider circulation throughout the world, and a farther-reaching influence upon thoughtful people; to become the trustee of increased endowment for scientific research, thereby being able to aid directly in new discoveries and new applications of knowledge.

## MEMBERSHIP IN THE AMERICAN ASSOCIATION

Any person interested in the progress of science and education in any way may become a member of the association and all are invited to do so. An application and information card is filled in and returned to the permanent secretary, with a remittance covering the amount of the entrance fee ($5) and the amount of the annual dues for the first year ($5).[1] On receipt of this payment by the permanent secretary the journal is ordered. A certificate of membership is sent to each new member as soon as he has been enrolled.

Any member of an *affiliated society* may become a member of the association on payment of annual dues for the first year ($5), the entrance fee being omitted in such cases, *providing application is made before the second October 1 following the affiliation of the society or following the applicant's admission to the society.* Such application should be made on a special (blue) application card provided for this purpose.

In making applications for membership the blanks on the application card should be carefully filled in, to the end that the permanent secretary's files and the published membership lists prepared therefrom may be correct. Cards may be obtained from the permanent secretary's office at any time.

Life members each pay $100 in one year (having paid the entrance fee or having had it omitted through membership in an affiliated society) and are exempt from all further dues.

Sustaining members each pay $1,000 and are exempt from all further dues.

Members who are engaged in scientific work or who have advanced science by research may be elected to fellowship in the association.

## FUTURE MEETINGS OF THE AMERICAN ASSOCIATION

Under the present rules the association holds its main meeting each year during convocation week—at

[1] Persons residing in the region of the Pacific Division or of the Southwestern Division send their applications and remittances for the first year to the division secretary instead of the permanent secretary. For later years they pay their dues to the permanent secretary. New members of the State College Branch pay entrance fees and annual dues for the first year to the branch secretary. For later years their dues are paid to the permanent secretary's office. Members of affiliated societies and academies send applications and all remittances to the permanent secretary.